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THE VALUE OF COMMERCIAL, ANTIBACTERIAL STREPTOCOCCUS SERA IN HEMOLYTIC STREPTOCOCCUS INFECTIONS*

BY LE ROY D. FOTHERGILL, M.D.,† AND ROLF LIUM, M.D.†

THE question is frequently raised as to whether it is justifiable or worth while to use antistreptococcus serum in certain patients with hemolytic streptococcus infections. This question is raised particularly in very serious infections such as puerperal sepsis, septicemia and hemolytic streptococcus meningitis. Inasmuch as such sera are not infrequently used in desperately sick patients, it seemed desirable to obtain some more exact data regarding their value if possible.

It should be pointed out that there are two types of sera available for use in streptococcus infections. One is an antitoxin, such as Dick antitoxin and erysipelas antitoxin. The second is an antibacterial serum, the presumed activity of which is designed to destroy the bacterial cell rather than to neutralize its secreted soluble exotoxin. In some instances antitoxic sera are said to contain antibacterial antibodies since the immunization of horses is accomplished by the injection of an agar mass inoculated with hemolytic streptococci. There is very little or no evidence that streptococcus antitoxin has any value in the relief of lesions due to direct invasion by the bacterial cells. For example, there is a general feeling that the use of Dick antitoxin does not lessen the incidence of septic complications in scarlet fever. The observations of Weech[1] are of considerable interest in this respect. Our main interest was whether bactericidal antibodies could be demonstrated in so-called antibacterial hemolytic streptococcus sera.

That bactericidal antibodies develop during the course of hemolytic streptococcus infections has been suggested by several studies. Recently Hare[2] studied the development of bacteriotropins in patients with puerperal sepsis. He employed Todd's[3] technique for this study. He found that bacteriotropins for the homologous organism were present before the fall in temperature in patients with extensive infection. They were not present in rapidly fatal cases but did appear in the later stages of more chronic and fatal cases. The titer of bacteriotropins did not fall just before death.

Prior to studying the commercial sera, we made observations on four patients with scarlet fever which indicate that bactericidal antibodies may be produced. Ward's[4] modification of Todd's technique (described below) was used in testing for bactericidal activity. Blood was taken from each patient during the convalescent period (twenty-first, sixteenth, eighteenth and twenty-eighth day of the disease). Two of the patients had uncomplicated scarlatina. The others had complications consisting of otitis media and mastoiditis in one, and otitis media and cervical adenitis in the other. The homologous organism was used in each test.

The blood of the two cases without complications possessed essentially no bactericidal power. The blood of the two cases with complications possessed a not inconsiderable bactericidal power. One cubic centimeter of the blood of each of the latter two was able to kill approximately 20,000 organisms.

These observations are of interest in two respects. They suggest that bactericidal antibodies for the hemolytic streptococcus do not develop during the course of scarlet fever unless some complication, characterized by important invasion of tissues, occurs. In addition these observations suggest that, under the proper circumstances, bactericidal antibodies for the hemolytic streptococcus may develop.

Observations were made on the bactericidal power of three different commercial antibacterial hemolytic streptococcus sera. These sera were purchased fresh on the open market and were as follows:

Serum A. Recommended specifically for use in puerperal sepsis.

Serum B. An antibacterial hemolytic streptococcus serum recommended for use in septicemia and other streptococcus infections.

Serum C. Erysipelas antitoxin. Said to contain antibacterial antibodies in addition to streptococcus erysipelatis antitoxin.

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Fifteen different strains of hemolytic streptococcus were used. The source of each culture and the disease in which it occurred were as follows:

Strain	Source of Culture	Clinical Diagnosis
1	Blood culture	Puerperal sepsis
2	Throat culture	Streptococcus carrier
3	Uterine culture	Puerperal sepsis
4	Blood culture	Puerperal sepsis
5	Throat culture	Streptococcus carrier
6	Blood culture	Puerperal sepsis
7	Throat culture	Scarlet fever
8	Throat culture	Scarlet fever
9	Uterine culture	Puerperal sepsis
10	Axillary abscess	Axillary adenitis
11	Spinal fluid	Streptococcus meningitis
12	Blood culture	Septicemia
13	Throat culture	Rheumatic fever
14	Blood culture	Septicemia
15	Otorrheal discharge	Otitis media

Ward's modification of Todd's bactericidal technique lends itself to a study of this sort. In this study the method consisted of placing 0.5 cc. of fresh defibrinated blood in each of seven test tubes. To each of these tubes a known quantity of antiserum was added. A young broth culture of the hemolytic streptococcus was diluted in broth in multiples of ten. One drop of the 10^{-5} dilution was plated out for a subsequent colony count. One drop of this dilution usually contained from forty to two hundred and fifty organisms. One drop of each of the dilutions was added to each tube of blood-antiserum mixture. The tubes were sealed and incubated overnight in a rotating machine. They were then opened and their contents cultured. In this manner one can determine the relative number of organisms killed by a known quantity of blood and antiserum. Since fresh, defibrinated blood contains both leucocytes and complement, the addition of antiserum should make this system ideal for testing the bactericidal power of any given antiserum.

Each of the fifteen organisms was tested with Serum A and Serum B. Eight strains were tested with Serum C. Human blood (authors') was used throughout this study. In each test blood alone was used as a control. This was done to be sure there was no natural bactericidal power in the blood. Serum was used in final dilutions of 1:10, 1:100 and 1:500.

A typical protocol is as follows:

It is evident that serum A had no bactericidal effect on strain 7.

RESULTS

There was no killing of bacteria by serum A with any of the fifteen strains tested. This is of added interest since five of these strains were isolated from patients with puerperal sepsis.

Serum B was tested with all fifteen strains. In two instances, with the 1:10 dilution of serum, there was killing of the organism beyond a 10^{-4} dilution of the culture. There was no evidence of killing with the higher dilutions of serum. In these instances the killing power was of little significance. Relatively, an enormous amount of serum was used compared to the number of bacteria killed and the amount of whole blood used.

Serum C was tested with eight of the fifteen strains. In no instance was there evidence of any bactericidal power. These observations are of some importance since this serum reputedly contained both antitoxin and antibacterial antibodies.

DISCUSSION

There are several explanations to account for this essentially complete absence of bactericidal power in these commercial sera. Because of the serological heterogeneity of hemolytic streptococci, it is possible that a given serum may not be homologous for the particular strain infecting the patient. The degree of immunization of horses may be insufficient for the production of a potent serum. Another possible explanation is that immunization may have been carried out with dissociated strains that no longer possess the antigenic constitution which characterizes the organism in its virulent stage. Studies along this latter line are being carried out in the Bacteriology Laboratories of Harvard Medical School at the present time. In view of the studies reported in this paper we feel that the antistreptococcus sera available at the present time are of no value in the treatment of patients infected with the hemolytic streptococcus. This, of course, does not apply to the use of streptococcus antitoxin as used in scarlet fever.

The observations with serum C are of particular interest. One would expect little effect

BACTERICIDAL POWER OF SERUM A FOR STRAIN 7

TWO HUNDRED ORGANISMS PER DROP OF 10^{-5} DILUTION OF CULTURE

	Dilution of Culture						
	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}
Control (no serum)	++	++	++	++	++	++	+
1:10 dilution of serum	++	++	++	++	++	++	+
1:100 dilution of serum	++	++	++	++	++	+	0
1:500 dilution of serum	++	++	++	++	++	++	+

+ = Growth. 0 = No growth.

from an antitoxic serum in any disease where the basic pathology is due to the direct invasion of tissues by the bacterial cells. This supposition is substantiated by these observations.

SUMMARY

The bactericidal effect of three different commercial hemolytic streptococcus sera was studied for fifteen different strains of the organism. Essentially no bactericidal power could be demonstrated with them.

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THE GONOCOCCAL COMPLEMENT FIXATION TEST IN THE BLOOD AND SYNOVIAL FLUID OF PATIENTS WITH ARTHRITIS*

BY WALTER K. MYERS, M.D.,† AND CHESTER S. KEEFER, M.D.†

FOR many years, the complement fixation reaction has been employed in the study of gonococcal infection. In the experience of a number of observers, it is a useful aid in the diagnosis of gonococcal arthritis. In the hands of others its value has been questioned. As a part of a study of the biological characteristics of synovial fluid in various types of arthritis, we have used this reaction in either the blood serum or the synovial fluid or both in 120 cases of arthritis‡.

The results of the tests done on the blood sera of various patients with arthritis, are summarized in table 1. They include gonococcal arthritis, rheumatic fever, rheumatoid arthritis and various other types of arthritis. In the latter group, there were cases of tuberculous arthritis, degenerative arthritis, streptococcal arthritis and Charcot joints.

TABLE 1

THE RESULTS OF GONOCOCCAL COMPLEMENT FIXATION REACTION IN BLOOD SERA

	Total Number of Patients	Total Number of Tests	Number of Patients Positive	Number of Patients Doubtful	Number of Patients Negative
Gonococcal Arthritis	43	75	37	2	4
? Gonococcal Arthritis	6	15	4	2	0
Rheumatic Fever	24	29	1	1*	22
Rheumatoid Arthritis	30	42	1	0	29
Miscellaneous Arthritis	17	21	0	0	17
Total	120	182			

*Previous history of gonorrhea, chronic gonococcal prostatitis.

RESULTS OF THE EXAMINATION IN GONOCOCCAL ARTHRITIS

In forty-three cases the following criteria were used to establish a diagnosis of gonococcal arthritis: (1) a history of a recent attack of gonorrhea; (2) the presence of a localized gonococcal infection of the genital tract, or (3) the presence of gonococci in the synovial fluid. None of the patients had received gonococcal vaccine. Aside from the forty-three cases mentioned, there were six other cases in which the provisional diagnosis of gonococcal arthritis was made. In these, the clinical course of the disease was compatible with such a diagnosis, but bacteriological proof of a localized gonococcal infection of the genital tract or joints was lacking. The results are summarized in table 1.

Thirty-seven of the forty-three patients or eighty-six per cent, showed a positive gonococcal complement fixation reaction at some time during the course of the disease. In thirty-three patients the test was positive upon the first examination, and in four the reaction was negative throughout the period of observation. In two it was doubtful.

At the time of examination of the four patients whose blood sera gave negative gonococcal complement fixation reactions, the genital infections had been present for no longer than two weeks. It was not possible to follow these patients during convalescence.

Two additional patients, seen soon after the original infection, were found to give negative reactions when first examined. During the subsequent course of the disease the reaction of

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‡The tests were done by the Wassermann Laboratory of the Department of Health of the Commonwealth of Massachusetts (Dr. William A. Hinton, Director).

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their blood sera was observed to become successively doubtful and positive.

In three patients, there was a reduction or loss of complement fixing powers for the gonococcus of the sera during the course of the disease. In each, there had been a chronic gonococcal infection for several years. With the appearance of a reinfection or an exacerbation of the existing genital infection and of an arthritis, the complement fixation was reversed from positive to negative.

In six patients, three of whom were women, a tentative diagnosis of gonococcal arthritis only could be made. In each patient one was led to suspect a localized gonococcal infection of the genital tract but bacteriological proof was not obtained. The clinical course of the disease in each patient was consistent with the diagnosis of gonococcal arthritis.

RESULTS OF THE EXAMINATION IN OTHER TYPES OF ARTHRITIS

In the seventy-one cases of rheumatic fever, rheumatoid arthritis and the miscellaneous group, only two patients gave positive reactions. A boy of fourteen, who had rheumatic fever, gave a positive reaction in both the blood serum and synovial fluid. Subsequent tests of his blood sera were negative; no evidence of gonococcal disease was disclosed. A young girl, who had rheumatoid arthritis and psoriasis was found to have two "positive" and two "negative" reactions. No reason was found to suspect gonococcal infection. The blood serum of another patient, a man of twenty-five years of age, who had rheumatic fever, gave a doubtful reaction. This patient had a previous history of gonorrhea and had a chronic prostatitis. Gonococci were identified on the smear of the prostatic fluid.

It is evident that the gonococcal complement fixation reaction of the blood sera of patients with gonococcal arthritis is positive in a large percentage of patients. A negative reaction may be encountered early in the course of the disease. The reaction, likewise, may be negative in the presence of a severe septic type of gonococcal infection.

In no patient with rheumatic fever, rheumatoid arthritis or various other sorts of arthritis, not gonococcal, has the gonococcal complement fixation reaction been found to be consistently positive. One patient, as noted above, who had rheumatic fever and whose blood serum gave on two occasions a doubtful reaction, had a gonococcal prostatitis.

RESULTS OF THE EXAMINATION OF THE SYNOVIAL FLUID

The results of the gonococcal complement fixation test of the synovial fluid are given in table 2.

TABLE 2

THE RESULTS OF GONOCOCCAL COMPLEMENT FIXATION REACTION IN SYNOVIAL FLUID

	Total Number of Patients	Total Number of Fluids Tested	Number of Patients Positive	Number of Patients Negative
Gonococcocal Arthritis	24	39	17	7
? Gonococcal Arthritis	3	9	3	0
Rheumatic Fever	12	14	1	11
Rheumatoid Arthritis	10	16	0	10
Miscellaneous Arthritis	9	10	0	9
Total	58	88		

Specimens of thirty-nine synovial fluids from twenty-four patients with gonococcal arthritis were studied. Fluids from seventeen of the patients or seventy-one per cent, gave positive reactions. In addition, fluids from the three patients with a provisional diagnosis of gonococcal arthritis were positive.

Synovial fluid from thirty-one patients with other types of arthritis were examined. The only specimen of fluid which was found to give a positive reaction was in the patient mentioned above with rheumatic fever whose blood serum yielded simultaneously a positive reaction.

CORRELATION OF FINDINGS IN BLOOD SERUM AND SYNOVIAL FLUID

With two exceptions the blood serum was obtained simultaneously with the synovial fluid. The reactions in the blood sera and the synovial fluids were identical except in six instances. The reaction of the synovial fluid from patients with gonococcal arthritis was negative in four instances when that of the blood serum was doubtful or positive. One patient with gonococcal arthritis had a doubtful reaction in the synovial fluid and a negative reaction of the blood serum. The reaction of the synovial fluid was positive when that of the blood serum was doubtful in one patient in whom the diagnosis of gonococcal arthritis was not proved.

The determination of the synovial fluid reactions can be said to add little information not obtainable from the study of the blood sera.

RELATION OF THE WASSERMANN REACTION TO THE GONOCOCCAL COMPLEMENT FIXATION REACTION

In seven patients, who had gonococcal arthritis, the Wassermann reaction was positive. The development of gonococcal complement fixing antibodies as a result of proved gonococcal infection was not influenced in these patients. A positive Wassermann reaction in six of the patients with miscellaneous types of arthritis who did not have gonorrhea, was accompanied by negative gonococcal complement fixation reactions.

It has been said (1) that a positive Wassermann reaction may give rise to falsely positive gonococcal complement fixation reaction. The result of the Wassermann reaction appeared to bear no relationship to that of the gonococcal complement fixation reaction in these patients. A positive Wassermann and gonococcal complement fixation reaction in the same patient would seem to indicate the presence of both syphilis and gonorrhea.

DISCUSSION

There seems to be ample justification for accepting a positive gonococcal complement fixation reaction as of considerable significance in the etiological diagnosis of arthritis. Similar conclusions were reached by several observers from the study of the reaction of blood sera[2, 3, 4, 5] and of synovial fluid[6].

It has been observed repeatedly that a negative reaction may be encountered early during the course of a gonococcal infection. Likewise, it has been noted that the appearance of demonstrable circulating gonococcal complement fixing antibodies may be inhibited in the presence of severe gonococcal infection.

In no instance was the reaction in the synovial fluid positive when that of the blood serum was negative. The reaction of the gonococcal complement fixation test of the synovial fluid seemed to depend upon the reaction of the blood serum.

The results of any complement fixation reaction are dependent somewhat upon the antigen used. No less important are familiarity and experience with the technical problems offered by this type of reaction. The complement fixation test is such that falsely positive reactions are occasionally encountered.

Repeated positive gonococcal complement fixation reactions are of significance even when no other evidence of gonococcal infection is disclosed. In our experience the employment of this test has proved to be of great value in the etiological diagnosis of chronic arthritis.

SUMMARY

The results of the gonococcal complement fixation reaction of the blood sera and synovial fluids of forty-three patients with proved gonococcal arthritis and of sixty-six patients with rheumatic fever, rheumatoid arthritis or some other type of arthritis have been analyzed.

A positive reaction was encountered in eighty-six per cent of the cases of gonococcal arthritis.

The blood sera of only two of the seventy-one patients who had joint disease not due to gonococcal infection gave isolated positive reactions. The reaction was doubtful in one patient with rheumatic fever who had a gonococcal prostatitis.

The reaction of the blood serum and that of the synovial fluid, simultaneously collected, were with few exceptions identical. The examination of the synovial fluid offered little advantage over that of the blood serum.

A positive Wassermann reaction did not influence complement fixation to the gonococcal antigen.

The routine employment of this test in the study of patients with arthritis was valuable.

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THE USE OF INSULIN IN MALNUTRITION*

BY HARRY BLOTNER, M.D.†

SINCE insulin has been discovered, it has been used in the treatment of a great variety of diseases, and beneficial effects from its use have been reported. However, next to its excellence in the treatment of diabetes, insulin appears to have its greatest usefulness in the treatment of nondiabetic malnutrition.

The drug was introduced first for this purpose in the United States and in the practice of pediatrics. In 1923, Pitfield[1], a general practitioner, injected one unit of insulin a day in two infants with inanition, with a consequent gain in weight. Since 1925 insulin has been employed in the treatment of nondiabetic malnutrition in adults, and many noteworthy reports of its value in this connection have been published. Most authors have been satisfied with the clinical gain in weight caused by the

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drug. Consequently, there have been few studies produced as to why it should be of value in this respect. Not long ago, I[2] reported some observations which may help to explain some of the beneficial clinical results that may be obtained with insulin in the treatment of nondiabetic malnutrition. This paper reports further studies on the same subject in seventy-nine normal, thin individuals.

CLINICAL MATERIAL

The individuals who were observed consisted of thirty-three men and forty-six women, all normal except for malnutrition. Their ages varied from nineteen to seventy-one years. They were thin for their age, sex and height. Their weights, at the beginning of insulin treatment, ranged from seventy-two to one hundred and sixty-seven pounds and their heights from fifty-eight to seventy-four inches. Most of them had been chronically underweight for years and had tried to gain weight by forced eating, long vacations, rest cures and medicines. Many were somewhat nervous, easily tired and lacking in energy. Some had dyspepsia and poor appetites while others ate well. All were ambulatory and continued to perform their routine duties during insulin therapy.

These patients were taught how to measure and inject insulin and how to sterilize and take care of an insulin syringe and needles. During the period of insulin treatment they injected themselves with ten units of insulin three times a day about twenty to thirty minutes before meals; a few took ten units twice a day and rarely the dose of insulin was increased to fifteen or twenty units three times a day. Most patients received insulin for six to ten weeks; some for four to six months and rarely for a longer period of time. They were encouraged to take daily a high caloric diet consisting of four to six glasses of milk, six slices of bread, cereals, eggs, meat, fish or chicken, potatoes, fruits, vegetables, butter, desserts, and various other foods as desired to balance the diet.

RESULTS WITH INSULIN TREATMENT

After insulin treatment was started, each patient began to gain weight and some continued to gain at a remarkable rate. The weekly weight charts of ten patients are shown in figure 1 and are characteristic of the results obtainable.

In general, the gain in weight was more rapid at the beginning of insulin administration, became less marked as time went on, and in some cases remained stationary whether or not insulin

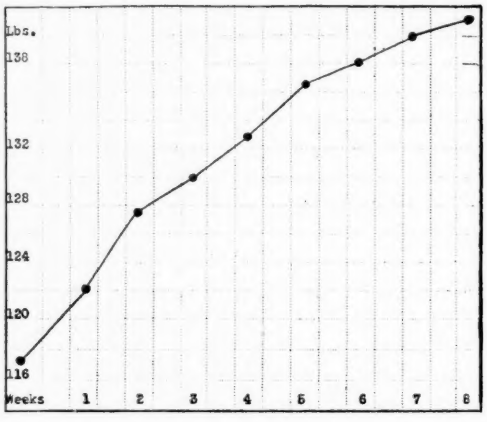

FIG. 2. Weight curve of E. M., a thin lady, receiving ten units of insulin three times a day.

was taken. It is interesting that most of the individuals have been observed from one to almost three years and their weights have varied approximately within five pounds above or below the weight when insulin was discontinued. Not many lost a great deal of the added weight and a few gained as much as fifteen pounds after the discontinuance of the injections. Causes for loss of weight were acute infections, hard work, economic conditions and nervousness. Five patients who had lost weight after omitting insulin resumed the use of the drug with a consequent but less striking gain in weight than originally. After six years of experience with insulin, Barker[3] is convinced that it is of very great value in undernutrition and that after the weight of the thin person is brought to nor-

GAIN IN WEIGHT IN THIN PATIENTS WITH INSULIN*

Case	Weight Before Insulin	Weekly Weights of Patients During Insulin Therapy									Gain in Weight During Insulin Therapy
		1	2	3	4	6	8	10	12	24	
1	97	102	106	112	113	112	112	117	117	.....	20
2	105	113	116	118	120	120	121	.....	.....	.....	16
3	112	115	118	118	119	121	122	.....	.....	.....	10
4	103	108	114	114	119	127½	.....	.....	.....	.....	24½
5	116	120	122	124	124	127	131	.....	.....	.....	15
6	123	129	131	135	136	138	.....	.....	.....	.....	15
7	141	143	145	146	148	151	.....	160	.....	.....	19
8	117	122	128	130	133	138	141	.....	.....	.....	23
9	81	84	87	.....	88	92	93	94	94	101	20
10	96	98	100	102	103	107	.....	.....	.....	.....	11

*Weight is recorded in pounds.

FIGURE 1.

mal and insulin stopped, as a rule, the increased appetite continues and one must then be careful to prevent the development of obesity!

Shortly after insulin injections were begun, there was a marked improvement in the sense of well-being in many of the patients. Their appetites increased. Often they became less nervous and more cheerful. Clinically, the drug appeared to have a good general effect. The fat which was added was usually distributed

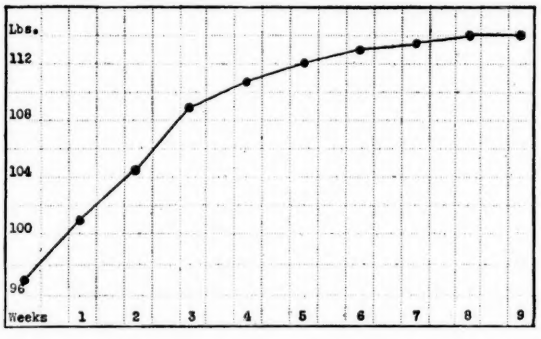

FIG. 3. Weight curve of R. W., a malnourished girl, taking ten units of insulin three times a day.

over the entire body. The appearance of the patients improved notably.

Local skin hypersensitiveness to insulin appeared at the site of insulin injection in one-third of the cases, usually beginning seven to ten days after the beginning of the injections. In two cases there was a mild general urticaria which necessitated the omission of insulin in one individual who gave a history of being unusually sensitive to a group of proteins. The appearance of these reactions after such a period of time suggests that perhaps it is due to insulin protein or possibly some other irritating substance in the preparation. In any event, after a period of several weeks they tended to disappear and no serious anaphylactic reactions were encountered.

CAUSE OF GAIN IN WEIGHT

The gain in weight caused by the use of insulin appears to be due to an increased intake of food and an increased absorption and assimilation. Of course, the psychological effect of insulin is noteworthy. Individuals who take insulin learn about hypoglycemic reactions and as the result eat more food to avoid a reaction. However, in one patient sterile water was injected for two weeks without his knowledge and without any gain in weight or change in symptoms. But, after insulin was used there was an increase in weight and improvement in the general well-being of the patient. On the other hand, it has been shown experimentally by Fonseca[4], Okada[5] and Lueders and Watson[6] that insulin stimulates gastric juice and the pancreatic and biliary secretions. Perhaps, therefore, insulin may actually increase the absorption of food by its action on the liver, pancreas and stomach of thin people.

That insulin increases the intake of food is suggested by a study of the nitrogen excretion in the urine. During the period of insulin treatment the nitrogen excretion rises considerably and after insulin is omitted it decreases to near the original level.

THE GENERAL EFFECTS OF INSULIN

Insulin appears to have a beneficial systemic effect in persons receiving the drug. This is supported by a study of the plasma protein concentration which tends to increase slightly during or after the period of insulin therapy, and by the red blood count and the total blood volume which increase measurably. On the other hand the basal metabolic rate is unaffected by insulin or may be slightly decreased by it.

There appears to be very little danger from insulin hypoglycemia in such cases even though there is no disturbance in their carbohydrate metabolism. This may be due to the fact that they are likely to eat sufficient food to avoid reactions, or if mild hypoglycemic symptoms appear, they know how to treat them.

Although certain observations[7] have been reported which suggest that insulin has an appreciable effect on the sugar tolerance in non-diabetic individuals, comparatively little is known of the effect of the drug on this phase of metabolism. Consequently the glucose tolerance[8], using a standard dose of 100 Gm. of glucose, was studied in twenty-five thin people made to gain weight with insulin in this clinic. It was found that in some cases a temporary decrease in the tolerance appeared during the period of insulin therapy. The finding was of no practical significance since the sugar tolerance returned to normal shortly after insulin was omitted. Decrease in tolerance to the usual diets employed in these cases while they were taking insulin was not observed even though their diets contained considerable amounts of carbohydrates. In all the cases the fasting blood sugar changed very little during the various periods of observation.

NATURE OF THE ADDED WEIGHT

Certainly the use of insulin has proved of great value in producing a gain in weight in cases of malnutrition without organic disease. However, the nature of the added weight has been subject to speculation.

The edema that appears in certain diabetic patients when insulin is first administered is a familiar picture. Edema, apparently, has little to do with the gain in weight from insulin in normal individuals; rather it appears due to an actual increase in fat deposit. If the water balance is measured during and after

the period of insulin administration, the relation between intake and output remains unchanged. Moreover, as demonstrated in one instance[9], if specimens of tissue are excised from the abdominal wall under local anesthesia, before and after twenty-four weeks of insulin treatment and a weight gain of twenty-one pounds, the depth of the subcutaneous fat and the size of the fat cells increase remarkably. In this particular instance the depth of the subcutaneous fat increased from 3 mm. to 16 mm., and the average diameter of each fat cell increased from 35 microns to 79.8 microns.

SUMMARY

This paper presents a study of the effect of the subcutaneous insulin administration in seventy-nine healthy, thin persons. Ten units of insulin, three times a day, was the standard dosage used, a few patients taking somewhat more or less than this amount. A liberal diet was employed.

After insulin injections were begun, almost all the patients gained weight immediately and rapidly. The increase in weight tended to become less marked as the weight approached the standard normal weight. Few of the patients lost much of the gained weight even after a considerable period subsequent to the discontinuance of insulin.

Insulin has a good general effect, most of the individuals receiving it feeling much stronger and more active than they had felt previously.

The gain in weight resulting from the use of this drug depends on an increased intake, better digestion and assimilation of food. It is not due to water retention but to an actual increase in the fat deposit.

The use of insulin to produce a gain in weight in certain cases of nondiabetic malnutrition is a reasonable, uncomplicated, and practical method of treatment.

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ARTHUS PHENOMENON

Report of a Clinical Case

BY JOHN A. MARONEY, M.D.*

IN 1903 Arthus[1] published a series of observations in which he described an acute inflammatory, local, anaphylactic reaction produced in the rabbit by repeated injections of horse serum at several day intervals. This reaction named "Arthus Phenomenon" by Nicolle[2] was described in children in 1909 by Lucas and Gay[3], and in adults in 1927 by Gatewood and Baldridge[4], who reported six cases. In 1931 Trumpeer, Matheson and Straus[5] reported a similar case and Irish and Reynolds[6] in 1933 reported a case entitled "Massive Anaphylactic Gangrene."

REPORT OF A CASE

CASE No. 200299, W. C. H., a twenty-one year old student nurse was admitted on February 26, 1932, for sore throat, cough, and running nose, with a past history of scarlatina, chicken pox, whooping cough, measles, German measles, bronchopneumonia, influenza and tonsillitis. She had had a tonsillectomy at two and a half years of age. There was no history of asthma, hay fever or "hives". She had received toxin-antitoxin immunization against diphtheria in 1929, following which she was found to be Schick negative.

A diagnosis of acute upper respiratory infection was made but routine nose and throat cultures were reported positive for diphtheria bacilli. After consultation it was decided to be on the safe side and 10,000 units of antitoxin were injected intramuscularly in the left buttock thirty minutes after a skin test was found to be negative. She did not show any immediate evidence of reaction except slight tenderness at the site of the previous T A T injections. Subsequent cultures were negative.

On the seventh day following the injection of antitoxin she presented fever, arthralgia, generalized lymphadenopathy, most marked in the groin; the left buttock was enlarged to twice its normal size, was tense and shiny with purplish mottling peripherally and fluctuation centrally. There was less marked reaction at the left deltoid, the previous site of T A T injection, and the left forearm, the site of the skin test.

Although the mass appeared necrotic and pus-filled, it did not break down and incision and drainage was advised against. With good nursing care and conservative treatment the inflammation slowly subsided over a period of two weeks. Examination a year later revealed a hard, slightly tender mass, the size of an egg, in the left buttock. She was

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cautioned against subsequent injections of horse serum.

DISCUSSION

Gatewood and Baldridge translate Arthus's paper in part as follows: "A rabbit receives subcutaneously every six days 5 cc. of horse serum. After the third injection there is produced in the zone of injection an infiltration which is soft, not disappearing for two or three days. After the fifth injection the infiltration which is produced is harder, edematous and does not resorb until after five or six days. After the sixth injection the edematous infiltration is transformed very rapidly to give a profound alteration in the subcutaneous cellular tissue, which gives a thick mass, compact, solid, white (absolutely sterile and not containing pus), persisting for several weeks unaltered. After the seventh injection the same change is produced but accentuated; the skin which recovered after being thickened becomes rapidly red, then blanched and dried. A gangrenous plaque is produced from which the tissue separates very slowly (several weeks) leaving a gaping wound, deep, healing with difficulty. The general condition of the rest of the animal is good."

This reaction as described by Arthus was thought by him as due to the liberation of antibodies. Tannenberg[7] suggested vasomotor spasm at the site of the injection, while Opie[8] concluded from his experiments that the reaction occurred when antigen and antibody, probably precipitin, meet in the tissues. Nordmann[9] concluded from his experiments that "arteries resist more and more the tendency to dilatation during and following the reinjection of the antigen, and that the cause of the final necrosis following later injections in the Arthus experiment is due to the ability of the arteries to become accustomed to the serum and that in consequence of this adaptation they are less and less altered by additional injections of antigen. Furthermore, our own results and those of Tonieti show that irritability of the nervous system, and in particular that of the venous system of the circulation is changed by the process of sensitization and we, therefore, do not hesitate to attribute the different behavior of the arteries to this changed attitude of the nervous system in normal and in sensitized animals respectively."

Menkin[10] states "accumulation of foreign protein at the site of inflammation explains the phenomenon of Arthus described by Auer[11] in rabbits sensitized to horse serum. The antigen accumulating in the inflamed ear reacts with antibody, intensifies a preëxisting inflammatory reaction and produces necrosis of the ear."

While the case cited above fails to fill the time and injection requirements as noted by Arthus, it presents a type of allergy corresponding to that described as following the sixth injection. The accompanying arthralgia and lymph gland enlargement, while not marked, suggested the diagnosis of delayed anaphylaxis with minor systemic involvement. While for a time it was felt that the buttock might slough, conservative treatment proved successful.

SUMMARY AND CONCLUSIONS

1. A clinical case of delayed Arthus phenomenon is recorded in a patient who had received toxin-antitoxin.
2. It is to be noted that an intradermal test for susceptibility to horse serum was negative.
3. A diagnosis of local anaphylactic reaction should be seriously considered in those patients that have received horse serum injection within ten days, even though all the findings are consistent with abscess.
4. Conservative treatment is advised in these cases, and subsequent horse serum injections should be administered with caution.
5. The increased use of antitoxin containing horse serum proteins with the probable increased incidence of serious allergic phenomena and the present conflicting theories as to causation indicate that this subject merits further experimental and clinical investigation.

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AUSCULTATION OF THE ABDOMEN: AN AID TO DIAGNOSIS

BY NEIL C. STEVENS, M.D.*

FOR over a hundred years physicians have routinely listened to chests. It has become one of the rituals of medicine. Some great authority at some time must have decreed that no one shall listen to abdomens. The writer has never seen auscultation of the abdomen practiced by any physician or surgeon except in some cases of intestinal obstruction or peritonitis, nor heard of it being taught in any medical school. The method is so simple, the information derived from it so important, that it is difficult to understand the reason for its comparatively common neglect, although Gerhardt in his book on auscultation and percussion devotes a section to this subject.

Auscultation of the abdomen is a method employed to determine the rate of peristalsis in the stomach and intestinal tract. In dealing with functional and sometimes pathological conditions it is important to know this. The rate may be determined by the fluoroscope but it is an expensive and time-consuming method and not necessary when the stethoscope can give the same information. By auscultation we are able to distinguish between a normal peristaltic rate, hypermotility or a silent abdomen. Between the latter and marked hypermotility there are all degrees of activity. But in the normal individual the rate is fairly constant. The writer has had his observations checked so many times with the fluoroscope that there is no question in his mind that it is an accurate method.

If one listens to the normal abdomen at an arbitrary point one inch above and one inch below the umbilicus, one will hear from five to ten faint tinkles per minute. The number of tinkles may vary slightly according to the time of day and the temperament of the individual. Peristalsis is more active for an hour or two after meals. But the normal stomach or intestines never omit loud, harsh or prolonged gurgles. To one who has accustomed himself to this method, the distinction between normal and abnormal sounds is marked and easy of recognition.

In nervous indigestion, in other functional and in some pathological conditions, the number and character of the sounds change. The number varies from ten to twenty a minute to a continuous gurgle. The high-pitched tinkle of the normal abdomen is replaced by a rumble, low-pitched and harsh. Sometimes the sounds are so loud that the stethoscope is not necessary. Increase in peristalsis is usually not constantly present in the same individual. There may be quiet intervals of days and weeks. In some extremely neurotic individuals, however, it is present nearly all the time.

*Stevens—For record and address of author see "This Week's Issue," page 137.

The writer does not pretend to be able to tell from what parts of the intestine the sounds originate, nor does this seem to him of much importance. The value of auscultation consists in determining the rate and character of the sounds. However, it may be possible to distinguish the sounds produced by the contractions of the stomach from those of the intestine by the higher pitch of the former, due to a greater amount of air in the stomach. If hypermotility persists in spite of treatment, the cause should be investigated further, as there may be an organic basis.

The writer has been treating a case of nervous indigestion in a woman of middle age for the past two years. She averages about one attack every two months. It is characterized by severe pain in the epigastrium, distention and gas. The attack regularly follows fatigue or worry. During the intervals, no more than the normal peristalsis is heard. During the attack, the sounds are loud, harsh and continuous. At this time she always imagines that she has some serious organic trouble, but repeated x-rays have revealed none.

Another patient, who is almost bedridden and who suffers from mucous colitis and numerous other ailments, has hypermotility practically all the time.

Most cases of acute abdominal distress of functional origin, if not due to constipation or hyperacidity, are due to hypermotility. Hypermotility is a very common condition. It begins most commonly in the third decade, when for most individuals the stress and strain of existence becomes more intense. During the last two years the writer has observed this condition in children, especially among those who have inherited an unstable nervous system.

Hypermotility is commonly, but not always, found in the following conditions:

Functional	1. Nervous indigestion. 2. Acute alcoholism. 3. Constipation due to a hypertonic condition of bowel. 4. In four cases of cyclic or periodic vomiting in children and in some children with a nervous inheritance and who suffer from malnutrition and indigestion.
Organic	1. Peptic ulcer. 2. Carcinoma of stomach. 3. Cholangitis and cholelithiasis. 4. In some cases of chronic appendicitis and in the early stages of acute appendicitis. 5. In the early stages of acute intestinal obstruction. 6. In some cases of coronary occlusion. 7. In some cases of postoperative distention.

Nervous Indigestion: Hypermotility is usually noted in cases of nervous indigestion. In

a few cases there is such marked spasm at the pylorus and presumably throughout the intestine that no sounds are heard. After the administration of belladonna or morphine the writer has noted the presence of hypermotility. This is true in cases where there is a large amount of gas in the cardiac end of the stomach. While the condition is acute a silent or almost silent abdomen is the rule. With hypermotility the sounds are low-pitched and harsh. The number varies all the way from ten a minute to a continuous gurgle. The commonest subjective symptoms are discomfort, distention, belching of gas and often pain which is usually intermittent. When the gas localizes in the right lower quadrant it may simulate closely an attack of appendicitis and lead to the removal of an innocent appendix, which I imagine has happened in numberless instances. The recognition of the presence or absence of hypermotility is important in this condition, because it is rare to find marked activity of the intestine accompanying an inflamed appendix.

Hypermotility is often the first indication of an unstable nervous system. Before the individual is aware of any abnormal tension or indigestion, auscultation may reveal an increase of the peristaltic rate.

When we are called to see a patient complaining of discomfort, distention and abdominal pain, how without listening to the abdomen shall we determine what condition exists? Are we confronted with a functional or organic condition? If functional, what is its cause? Is it of nervous origin or a simple atonia with constipation and poor elimination? In a large number of cases do we not base our diagnosis on nothing more substantial than a guess? We prescribe soda and carminatives or a sedative or advise a cathartic or an enema for no valid reason. Sometimes we guess right and sometimes we aggravate the condition with irritating drugs. In either case, it is the trial and error method.

Recently I was called to see a girl of high-school age who had been sent home by the school physician with a diagnosis of appendicitis. Her temperature was a little over a hundred, pulse 90. She had vomited two or three times. She complained of pain in the right lower quadrant and there was marked tenderness over McBurney's point. No blood count was done. On the basis of her symptoms and physical signs, the diagnosis of appendicitis seemed to be justified. But there was marked and continuous peristalsis. For this reason I was willing to wait a little while and see what effect a large dose of belladonna and phenobarbital would have. Four hours later the pain had practically disappeared, but the tenderness still remained. The next morning she was symptom-free and the following morning returned to school.

Several years ago I was called to see a boy suffering severe pain in the right lower quadrant. At the beginning of the attack, four hours before, the pain was general. He had vomited several times. There was marked tenderness over the entire abdomen. Peristalsis was loud and continuous. However, due to the severity of the pain and the fact that at first the pain was general and later localized in the right lower quadrant, I was not willing to take the responsibility of delay without the consent of a surgeon. A surgeon was called who advised his removal to the hospital. While the child was getting ready to go, the pain suddenly stopped and there was no recurrence that night or for several weeks thereafter. Later an x-ray revealed a transposition of the intestines with the cecum and appendix in the left lower quadrant. During the next two years the boy had several similar attacks, but they were controlled by sedative drugs. For the past three years he had none at all and has apparently outgrown them.

Alcoholism: Hypermotility is very frequently seen in cases of acute alcoholism. It is partly responsible for the discomfort and flatulence experienced for a day or two after a bout.

Constipation: Constipation is often due to a hypertonic rather than to an atonic condition of the bowel. In such cases it is doubtful whether irritating cathartics and high colon irrigations have more than a temporary beneficial effect.

Cyclic Vomiting: The cause of cyclic or periodic vomiting in children has always been obscure. Howland says, in the last edition of Holt and Howland, "These cases have nothing in common with ordinary attacks of indigestion. With our present knowledge they are to be regarded as explosions due to a faulty metabolism." Other writers have emphasized the strong nervous element in these cases. Still others maintain they are due to a condition of acidosis.

Certainly one is not at liberty to draw any conclusions from a series of four cases, but because these cases were so similar in their symptomatology, physical signs, and response to treatment, the writer is hopeful that in a larger group the underlying principle will hold true.

In all four cases there was the factor of inherited nervous instability. Hypermotility was common to all and all responded well to the same treatment, small doses of phenobarbital. The age ranged from three to seven years. Two of these cases are sufficiently interesting to describe in more detail.

The first case, a girl of six years of age, has never been in good health. Her mother cannot remember when she had not had periodic attacks of vomiting. When the writer first saw her, she was a pale, asthenic child, eleven

pounds under weight. Her vomiting attacks occurred about once a month, occasionally at longer intervals. They lasted about three days, causing extreme weakness, and requiring another two days rest in bed to regain her strength. Peristalsis of the intestine was markedly increased. She had been under the care of a pediatrician in New York, who had kept her on a very strict diet. She was given a teaspoonful of elixir of luminal three times a day and allowed to eat what she wanted within reason. For two years this child had no attacks, except once during an attack of grippe. She gained fifteen pounds, goes to school, plays games and is apparently a normal child. Luminal was given for the first two months. She has had practically none for over a year.

Another girl, aged seven, gives very much the same history. Periodic attacks of vomiting ever since a baby, occurring once in every six weeks or two months. For the past three years she has been under weight. The writer first saw her in May, 1933. The peristalsis was markedly increased. The mother said she had heard it herself at times. She was given the same treatment as the first case. Her mother wrote me lately that she had had no return of the attacks, had gained about six pounds in weight and had a good appetite for the first time in years.

The other two cases in this small group are not so striking. The vomiting has stopped in both cases, but the increase in weight has been no more than one would expect in a growing child. Both of them are a few pounds under the normal weight.

In considering the value of auscultation in relation to pathological conditions of the abdomen, its chief value lies in the aid given to the diagnosis of acute appendicitis. It is well known by all roentgenologists that hypermotility is the rule in peptic ulcer, diseases of the gall bladder, in some cases of carcinoma of the stomach and in some cases of chronic appendicitis. In the last five cases of coronary occlusion the writer has noted hypermotility in four of them.

Acute appendicitis: Whether nature is purposeful or not in her efforts to cure disease, to protect an inflamed or damaged organ is an open question. But we do know that in acute appendicitis the muscles of the right side of the abdomen are thrown into spasm and an effort is made to wall off the inflamed organ by omentum and adhesions, and as the attack progresses the peristalsis diminishes. In the beginning of an acute attack of appendicitis there may be increased peristalsis. The writer has followed two cases from the onset of pain to the time of operation and has noted the gradual lessening of peristaltic activity. All surgeons recognize the silent abdomen of peritonitis.

However, in cases of acute indigestion which simulate appendicitis the peristalsis does not diminish, but may increase with the severity of pain. At times when it is not easy to have a blood count, this is often a valuable differential point. In cases with steadily increasing pain in the right lower quadrant and diminishing or absent peristalsis the probability that one is dealing with an inflammatory condition is strong. If an enema has been given, the value of auscultation is lessened because it is difficult to distinguish between peristalsis and the gurgling of water in the intestine. The taking of salts or castor oil by the patient destroys its value also.

We were taught in medical school that postoperative distention was due to a paresis of the bowel. In four cases that the writer has followed just the opposite condition has prevailed, spasm and hypermotility. This observation is merely mentioned with no assurance that it will hold true in a large series of cases. But, if it is a fact in many cases hypermotility and not paresis is the cause of distention, it would seem more reasonable to use sedative drugs rather than turpentine stupes, enemas and pituitrin in its treatment.

Eight years ago the writer began to listen to abdomens with no expectation of hearing anything of value. But it was not long before he realized that there was a great difference between the sounds of the normal digestive tract and the intestine that was either functionally disturbed or disturbed from the presence of an organic lesion. The change that occurs is the change in the rate and the character of the sounds.

Some physicians are doubtful as to the importance of estimating the peristaltic rate and yet all of them, in making a physical examination, would want to know the pulse rate, the respiratory rate, and in some cases the basal metabolic rate. As the pulse rate is an index of the condition of the heart, and the basal metabolic rate an index of the condition of the thyroid gland, so the peristaltic rate gives us a clew to the state of the sympathetic nervous system, and very often the first clew that the stimuli exciting it are abnormal and excessive.

Although the method is extremely simple, the writer has found it to be, in his practice, one of the most useful diagnostic methods.

SUMMARY

1. In the differentiation of functional indigestion, auscultation of the abdomen is of value. Fluoroscopy and auscultation are the only methods available in making a diagnosis of nervous indigestion.
2. It may prove to be of value in determining the cause of some cases of cyclic vomiting in children.
3. It is of considerable value at times as an aid to the diagnosis of acute appendicitis.
4. It may also prove to be of value in determining the condition of the bowel that exists in postoperative distention.

MASSACHUSETTS MEDICO-LEGAL SOCIETY

THE ADMIRAL EATON CASE*

BY GILMAN OSGOOD, M.D.†

EATON: At Assinippi, Norwell, March 8, Rear Admiral Joseph G. Eaton (retired), 66 yrs. 1 mo. Funeral at late residence, Assinippi, Tuesday at 2 o'clock. Relatives and friends invited. Burial at Oakland Cemetery, Lowell, Wednesday.

THIS brief death notice prefaced thousands of columns of news space then about to be taken in a nation-wide interest in this death. Rear Admiral Joseph Giles Eaton, of Colonial New England stock, was born in Alabama in 1847, his father being in business in the South at that time; but on the eve of the Civil War the family moved north and settled in Lowell.

He attended Worcester Military Academy and later became a cadet at the Naval Academy, Annapolis in 1863. He had some Civil War service.

In 1867 he was ordered to the Ticonderoga, one of Farragut's fleet, which for several months was engaged in a triumphal voyage along the coast of Europe, visiting many countries and fêted by their rulers.

Subsequently in 1870 he was assigned to the Darien expedition, with five months spent in the African jungle, and the following year was assigned to land duty in Boston where he had opportunity to court Mary Ann Varnum of Lowell, whom he married in 1871. They took up residence in Pawtucketville, where one child, Isabel, was born. She died when 13 years of age.

In 1874 he was again ordered to sea and his subsequent assignments and activities related to duty on the Pacific, The Isthmus and in the Spanish-American War with a full measure of exciting and interesting experiences, which in themselves could provide material for a book of reading interest. His last command was the Massachusetts in 1903, and in 1905 he was commandant of the Charlestown Navy Yard.

He was affiliated with the Naval and Military Societies and a contributor of papers on Naval History and Nautical subjects.

February 6, 1906, his wife died in Washington. Her physician, Frank Fremont-Smith, M.D., diagnosed her disease as cerebral apoplexy and during her illness, which was of about two weeks' duration, obtained an attendant nurse, a Mrs. Ainsworth, who was said to be a very well-appearing woman, neatly dressed, conscientious, efficient and with a pleasing manner.

After the funeral Mrs. Ainsworth and her two children continued to live with Admiral Eaton. She obtained a divorce from her husband July 12, 1906, and on July 25 was married to the Admiral in Park Street Church in Boston.

They lived in Brookline eleven months and on October 31, 1907, they were living in Assinippi.

Up to the time of their marriage, he did not know that Mrs. Ainsworth was a married woman, supposing her to be a widow, and when it came to his knowledge that the moneys that he had been giving her were used to defray divorce proceedings, although not pleasing to him, he said that he was too much of a gentleman to abrogate the promise he had made to her.

In his new home he seemed content to live the simple country life, devoid of active interests other than related to his little farm.

He was respected by his neighbors who appreciated his superior intellectual qualities, and to them appeared to be a man who enjoyed good health.

On August 16, 1909, a birth notice appeared in the *Rockland Standard* which focused the attention of the district on the Admiral's family and read as follows: "Born in Assinippi, March 25, to Admiral and Mrs. Joseph G. Eaton, a son."

A few months later while summering in Scituate this child suddenly died and Mrs. Eaton accused her husband of poisoning the child. This affair brought to light the fact that the baby was not born to the Admiral and Mrs. Eaton, but that its mother was Elizabeth Nettie Heartz and was born in a maternity hospital in Boston and subsequently legally adopted.

The Admiral's fondness for children and his strong desire for a son was said to have led to the adoption of this boy baby, but when its death occurred his wife's charges against him, of having poisoned this child, caused an investigation to be made and the child's viscera were sent to Professor Whitney, who found no evidence of the child's having been poisoned.

This affair caused so much disturbance in the home that Mrs. Eaton took up her residence in Weymouth, but after some months the charges of poisoning seemed to have been forgotten and the family was reunited.

Mrs. Eaton was born in Alexandria, Va., in 1874, and at the time of Admiral Eaton's death was 39 years old. Her grandfather was a wealthy slaveholder, but suffered reverses incident to the Emancipation Proclamation.

Her mother, whose maiden name was Virginia Smith, possessed of distinctive qualities

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of moral excellence, was one of the most beautiful women in Alexandria and all her children were nice looking.

Her father was said to be sporty, lived up to his income, was warm-hearted, impulsive, quick to pick a quarrel and quick to forgive.

He was a prosperous fish merchant in Alexandria. When Mrs. Eaton was three years old, her father's business declining, the family removed to Washington and he there conducted a boarding house for a while with poor success and later removed to the West, where he and his eldest daughter lost their lives by drowning.

When Mrs. Eaton was seventeen years old she married D. H. Ainsworth, who held various Governmental clerical positions which he did not keep, and he later became a book agent.

Members of the Eaton household in Assinippi comprised Admiral and Mrs. Eaton, Mrs. Eaton's mother, Mrs. George Harrison, aged sixty-nine, her eldest daughter, Mrs. June Keys aged twenty, whose husband divorced her about this time, saying that he was not the father of her child Eleanor, and Dorothy, aged sixteen, the Admiral's favorite, who, by reason of infantile paralysis, was lame.

A sidelight on June's character is found in her application for a marriage license in Somerville in 1912 when she described herself as the eldest daughter of Admiral and Mrs. Joseph Giles Eaton.

June entertained the same beliefs held by her mother that the Admiral was a veritable Jekyll and Hyde, untrustworthy, poisoner, irresponsible and a menace to the household.

Such was the background of the momentous events that were about to transpire.

Mrs. Eaton once told Dr. Frame, her family physician, that she was afraid of being poisoned by her husband, that he was insane and addicted to the use of drugs. On one occasion she refused to take medicine prescribed by the doctor because the Admiral had opportunity to handle it. From his knowledge of the Admiral he did not believe that her convictions were true.

On Friday, March 7, at 7:30 A.M., he called at the house to see Mrs. Harrison, and while there was asked to see the Admiral, who was suffering excruciating pain in his stomach. The Admiral, having been ill all night and vomiting much, attributed his illness to fresh pork which he ate the night before and remarked "no more pork for Joseph."

The next morning at 5:50 o'clock Mrs. Eaton telephoned Dr. Frame that the Admiral was dead, and he was so surprised at this inexplicable death that he decided to call in the Medical Examiner, which decision was acted upon an hour later and with him repaired to the Eaton homestead.

The body lay on the edge of the bed, and beside it on the other side, which was close to the center of the bed, was fresh vomitus. Rigor mortis was present and death was estimated to have taken place eight hours previously.

The widow's story was that he had been sick a long time and that he had trouble with his stomach; that while asleep in an adjoining room with her daughter Dorothy, she was awakened about 3 A.M. by a voice calling "Jennie" and that she and Dorothy went to his room and found him lying on the floor. They put him back into bed and she lay down beside him and dropped off to sleep, and when she awoke his body was cold and she concluded that he was dead.

The autopsy was performed that afternoon, Dr. F. G. Wheatley, Associate Medical Examiner, assisting, and the brain, heart, lungs, liver, kidneys and stomach, unopened were removed and placed in the hands of Dr. Whitney that night, together with a variety of bottles, contents unknown, found in the Admiral's room. The widow, who was present when gathering this collection, was asked as to the contents of one of the bottles and replied that she thought it was poison. Before leaving the house she called me into a side room and said, "I do not know anything about poison, I never made a study of it" and also asked if I did not find evidence of homicidal insanity.

She also said that the Admiral was sly and cunning, that he had been taking drugs for years and that his knowledge of poisons was gained from the ship's library to which he had access; that she would not partake of a glass of water if he should offer it to her. She said the only medicines given him were pills and saleratus prescribed by Dr. Frame. In her conversation she was without emotion.

She was arrested March 20, 1913, charged with the murder of her husband, indicted March 28, and on October 14 her trial, lasting 14 days, began. One hundred and twenty-five jurors were examined and eighty-two excused before the panel was full. A large number of witnesses were summoned from near and from far. Distinguished counsel represented the Government and the defendant.

In giving an account of the Admiral's last sickness, Dorothy testified in part as follows: "I came home from school at 3:30 o'clock on the Thursday before father's death. There had been nothing unusual in his condition when I left in the morning and it was the same when I returned from school. We had tea in the kitchen that evening; usually we had it in the dining room. Father, mother and I sat at the table, grandma being in the dining room. We had cold fresh pork, tea and cereal coffee. Mother prepared the meal. We sat at the table and had talked for half an hour when father left the room saying that he was sick. As he left he put his hand to his stomach and later I heard him vomiting. Mother told me I must go right to bed. I told her that I had

some lessons to prepare, but she made me go to bed.

"Father came up to bed about 9 o'clock and said he was feeling better."

She slept that night and on returning from school Friday afternoon, went to his room and found him feeling very miserably. He said that the room was cold and asked her to get him a hot water bottle, which she was on her way to obtain when she met her mother coming upstairs. Her mother was very angry with her for waiting on her father, telling her not to do so again and saying that she had been giving him medicine every three hours. Her mother went to bed at 8:05 and she was told to be in bed by 8:30. Both doors in her father's room were locked that night.

She went to sleep and was later awakened by Mrs. Harrison, who was at her door saying that the Admiral had fallen out of bed. She went to his room with her mother, found him on the floor and helped to put him back in bed. She and her mother then returned to their bed and both slept until she heard her father calling her name and while her mother slept she went to his room and talked with him. In his delirium he was helping her with her examples. He told her to go to bed. She did so and slept.

Professor William F. Whitney of the Harvard Medical School testified to receiving a letter from Mrs. Eaton, September 11, 1909, relating to the death of the adopted child, already alluded to, which read as follows: "Will you kindly inform me how much longer it will be before you can state exactly what my dear little, healthy, strong child died of. I am alone in this isolated place with my husband, Admiral Joseph G. Eaton, whom I know to be a dangerous, insane man. My heart and pity go out to this man who is so clever that he fools the world at large, but not me. Now search for foreign poisons and he has all the cleverness of a maniac and cunning enough to use one that would be hard to detect. He has been planning my 'death' all day to-day and yet I am powerless and I trust on the finding of poison to have him examined for insanity and taken care of. I don't want his money (salary), he has no money, but I do want the state to take charge of that dear little life and him, for he is mad. Please let me hear from you at an early date, and search for a cholera, subtle poison.

Respectfully,

MRS. J. M. EATON.

"Also have a thorough examination of his food and medicine, if it is a poison, it is a subtle one, as he is familiar with cholera and has spoken about poison used for it and as much as said they could not find it, it is so much like symptoms of cholera. So watch on these lines. I know he is insane."

Dr. Whitney testified to receiving the organs from the Admiral's body as already described and that all seemed to be normal except the stomach, which showed evidence of inflammation and small hemorrhages. There was no evidence of alcoholism. The stomach contained more than a pint of a dark fluid, and here was found slightly over eleven grains of free arsenic and one grain of dissolved arsenic. Arsenic was found in all the organs and was probably present in portions of the body that were not sent to him.

The total amount of arsenic found was 16.67 grains and the ordinary fatal dose is two or three grains. He testified that in his opinion the first dose was taken within two hours previous to the first seizure of vomiting and probably within one hour and that the arsenic found in a free powder form in the stomach must have been administered from two to six hours previous to his death. He believed that fully as much arsenic had been thrown off as had been retained.

He also testified on cross-examination, that the large amount of arsenic found in the stomach supported the theory of self-administration and that it was possible to have extended omissions of vomiting following the taking of a dose of arsenic.

Dr. William Balch testified in corroboration of Dr. Whitney's testimony.

The defence contended that the Admiral was addicted to the use of drugs and alcohol and in support of these assertions, Dr. Smith testified that he used alcohol to excess after the death of his first wife.

Rear Admiral Clark testified that the Admiral was alleged to be intemperate in his habits.

Lieutenant Richardson testified to his, at times, having the appearance of being under the influence of drugs.

Dr. Blanchard of Brookline testified to having seen him confined to bed under the influence of liquor.

But the testimony of Dr. Jacob W. Brown, aged eighty-three, alluded to as the backbone of the defence, and which was assailed by the District Attorney in his summing up as a disgrace to the Commonwealth of Massachusetts, was to having sold Admiral Eaton 45 grains of arsenic and also of having seen in his possession 60 capsules containing one grain of arsenic. He also testified that the Admiral was familiar with the use and danger of poison.

His testimony might have had greater weight were it not for the fact that he was at that time serving a sentence of from five to seven years in State Prison for an illegal operation, and that he had been sentenced to State Prison on four different occasions.

When the defendant took the witness stand she smiled as she took her seat, appeared more composed than usual and answered the ques-

tions of her counsel in a clear, well-modulated voice. A close observer thus alluded to her testimony: "She was too clever to be disconcerted by cross questioning of any sort." This tribute to her wonderful poise and her ability to explain anything, no matter how damaging it had been made to appear, is paid to the prisoner by everyone who has heard her. "She is the most wonderful witness I have ever heard," said one lawyer who has watched many murder trials and is a good judge. Having the utmost respect for the District Attorney, he said that he considered her his intellectual equal at all times. She baffled him at every critical point. Voluble as she was she rarely spoke to her own hurt, and that she was so adroit that in apparent innocence she managed to get before the jury several times conversation between husband and wife with none other present.

To the casual observer the strain on her was slight and she appeared fresh after the ordeal of six hours on the witness stand.

Dr. Austin, testifying for the defence, was of the opinion that the fatal dose was taken directly after the noonday meal Wednesday (previous testimony having shown that Mrs. Eaton was not at home from 11 A.M. Wednesday until some time Thursday morning). He believed that one dose had been taken Wednesday at noon because the poison was found in an undissolved state, that the symptoms were not inconsistent and nothing in the report of the autopsy showed that more than one dose had been taken. On cross-examination he admitted that conditions found also constructed a case not inconsistent with the state's theory that the first dose was taken Thursday at supper time, that it was a small dose and several other doses were given between that time and the time of the Admiral's death. The defence's attitude on the question of insanity was that her defence was not insanity but innocence of the charges with which she was accused.

Her attorney described her as of spotless and unblemished character, maintained that the prosecution did not show a motive and said the strongest proof of her innocence was that she did not tell an inconsistent story on the witness stand. He said, "If this woman had broken down and wept, people would have said she was acting; this woman simply cannot act."

The District Attorney indicated in his plea that a verdict of not guilty by reason of insanity would not be displeasing to the government.

In declaring her to be a paranoiac he said, "Toward whom will her hallucinations next be directed; will it be toward Dorothy or will it be toward her aged mother?" He spoke for three hours and fifteen minutes. Defence attorney spoke four hours. After deliberating nine hours, the jury brought in a verdict of not guilty.

Throughout these proceedings the defendant continued to maintain the same calmness which had characterized her demeanor during the progress of the trial. Following her acquittal she did not appear to seek retirement from the public eye and her activities were broadcast to the reading public. She devoted some of her time to literary pursuits and wrote several short stories which were published in the *Boston Post*. "The Boy and the Woman", a pathetic story around a youth whose love dreams are aroused by a "Vampire", was one of them.

In June, 1914, seven months after her acquittal, she remarried Ainsworth, the man whom she said she divorced because he was an habitual drunkard. The family continued to live in Assinippi and Ainsworth's habits were unchanged. During about a year's residence there, in which time he had made seven trips to Boston, he was on six occasions arrested for drunkenness.

We now find the village of Assinippi again aroused, this time by a mysterious prowler whom June thinks is the "secret son" of the Admiral, who was not satisfied with the verdict rendered by the jury. She had indeed seen him as he, in the dead hours of the night, placed a ladder to her bedroom window and glared at her through the glass, whereupon Mrs. Ainsworth, the former Mrs. Eaton, employed detectives who held all-night vigils in search of this mysterious person.

In February, 1915, June was committed to the Taunton State Hospital through the Second Plymouth District Court.

In July, 1916, we find Mrs. Ainsworth interviewing Mrs. Harris, wife of Dr. Harris, President of the Massachusetts College of Osteopathy, who was shot by his former pupil, Dr. Atwood, in the Westminster Hotel, which interview commanded prominent newspaper space.

September 7, 1917, Mrs. Ainsworth and Dorothy were arrested for abandoning June's four months' old baby (paternity unknown) in the vestibule of Dr. Harold Bowditch's apartments in Brookline. A note pinned to the baby's clothing gave its name as Woodrow Wilson Keys. At this time they had taken up residence in Guilford, Conn., to which place June had been transferred from Taunton.

In 1922, nine years after the trial, we find Mrs. Ainsworth running a boarding house in Washington, the same occupation in which her parents were engaged forty-five years previously. The family then consisted of Mr. and Mrs. Ainsworth, their two children, June and Dorothy, together with Dorothy's husband and two children. Changes of residence have since occurred but Mrs. Ainsworth and her two children are still living.

The Admiral Eaton case is of interest, not alone for its poisoning features but for the correlated question of insanity.

Although I may seem to have given unnecessary details, I have tried to condense a wealth of available material in order to portray the inward workings of the defendant's mind, and to emphasize the value of a knowledge of paranoia. It is a chronic mental disease, always due to an hereditary taint and characterized by delusions.

A persecutory form is known as Paranoia Sexualis, and in women is characterized by delusions of jealousy. Groundless suspicions arise when the husband is pursuing the everyday normal and proper relations with society. The then Mrs. Eaton thought that the Admiral looked upon all women with lascivious eyes. She feared designing women because she appreciated the prestige of a high officer in the Navy.

She thought he had made several attempts to ravish June, whom she said lost thirty pounds in one week, and had discharged over six servants for these reasons. She thought a member of the church choir had resigned her position on account of his unwelcome attentions and had seen him wink at her when she was seated at the window in her home a quarter of a mile away. She believed that he had ravished girls and then poisoned them. She had definite ideas as to how he attempted to put poison in her tea. After a meal the dishes were carefully wiped and all the unused food was thrown away, even to the salt and pepper, and a lock put on the pantry door. She described the Admiral as a monster and, fearing he would burn the house, appealed to J. F. Chase of the Watch and Ward Society, and to Dr. Jelly in her anxiety.

When these attempts on one's life are thought to have been made; when it is believed that the husband brings into the house dissolute women, and here orgies are held, while the wife is lulled into unconsciousness by hypodermics of drugs (and these ideas were all maintained by the then Mrs. Eaton) then the paranoiac wife may become furious and not infrequently murders her husband.

It is characteristic for the paranoiac to be calm, undisturbed, unemotional. If you can recall the demeanor of Harry Thaw as described in the newspaper accounts of his slaying of Stanford White, you will remember his having deported himself in this same manner.

If any of you have perchance been in close contact with a paranoiac immediately after he has committed murder, you must have been impressed by the calmness with which the murderer deports himself, entirely free from that tension which might be expected from one who has just killed another.

Dougherty, who killed Dr. Lloyd and whose revolvers I faced after they had caused his death, were held by him without tremor.

When it comes to his day in court, you will observe the paranoiac enjoying the notoriety which has come to him. Coolness, calmness, and keenness are his characteristics and as these distinctive traits do not measure up to the layman's ideas of insanity, one can understand why jurors make mistakes when having this type of mental disease to deal with. In the Admiral Eaton case these characteristic symptoms were utilized to prove the innocence of the defendant.

How many times similar mistakes have been made by juries is simply a matter of conjecture, but having knowledge of one I will mention that of a man who was taken out of the Kings County Lunatic Asylum on a writ of habeas corpus and discharged against the strong protests of the doctors who testified to his being a dangerous paranoiac. He was so clever and made such plausible answers to questions asked by the jurors that they thought a much abused man had been unjustly confined in a lunatic asylum. The illusion, however, did not last long for he soon committed an homicidal act and when returned to the court, he was sent to Sing Sing and not returned to the hospital where he rightfully belonged.

There is no better example showing the inability of judge and jury to deal justly than in the Guiteau case, which will long be remembered in medico-legal annals as a blot on the pages of history, for he was insane and in need of hospital care rather than execution.

Mrs. Ainsworth, for over twenty years, has been free to move in society unrestricted. What her reactions have been we have no means of estimating.

As to its toxicological features, a death by poisoning has a weird and fascinating influence on the public mind.

Arsenic in the form of sulphuret of arsenic was known to the Greeks as early as the fifth century.

When the Arab chemist, Geber, was able to obtain white arsenic which is tasteless, an appreciation of its value became evident to the criminal poisoner, and arsenic has probably been responsible for more homicidal deaths than any other drug. It is a favorite weapon because its tastelessness enables secret administration and its deadliness is sure.

As regards the contention of the defence that the finding of 11 grains of arsenic in the Admiral's stomach was presumptive evidence of self-administration on the ground that it would hardly be possible to administer such quantity without the Admiral's knowledge, it is interesting to recall the Madeline Smith case in Glasgow in 1857 and the Holt case in Chester in 1863. Madeline Smith was tried for the murder of one L'Angerlier in whose stomach

88 grains of arsenic had been found, and Dr. Christison, the great toxicologist of his day, testified that he knew of no case where so much as 88 grains of arsenic had been found in the stomach after death. This was the turning point of the defence and with this evidence, carrying with it the presumptive deduction of suicide, the defendant was acquitted; and yet only six years later a woman named Holt was tried for the murder of her mother, whose body was exhumed and examined after it had been buried eleven weeks, in which 154 grains of arsenic was found and the defendant was found guilty.

When a person who is being fed arsenic comes to the latter stage of his sickness, his mind is wandering as was described by Dorothy when the Admiral thought he was helping her with her examples and it is reasonable to expect that the person administering the arsenic would take advantage of this delirious state to administer larger and larger amounts in order to complete the job as soon as possible. A large amount of arsenic recovered from one's stomach after death is therefore no more presumptive evidence of suicide than it is of homicide for it is easily explainable in either case.

Why are arsenical homicides so rarely brought to the attention of the medical examiner? Has human nature changed? Has the multiplication of other toxic agents been the means of relegating arsenic to the shelf of unpopular homicidal agents? Or is the etiology of gastrointestinal disturbances sometimes overlooked by the physician and a certificate of death rendered without further investigation?

The Admiral Eaton case has passed into history as a case of arsenical poisoning in a manner unknown. Its duplicate is not likely to again be seen in our Massachusetts courts. Now that the Briggs' Law obligates examination of such defendants before trial can take place, it is inconceivable that a person in need of hospital care will be obliged to fight for his life. Neither should the relatives and friends be obliged to bear the ignominy that comes from the logical acts of a mentally ill person.

The Eaton trial was conducted at the Plymouth Court House. Prominently on its façade is the figure of Justice, symbolizing fairness in dealing with others, fairness in the representation of facts, and just treatment. Within her range of vision is Plymouth Rock, and a little farther south the site of the habitat of Rachel, whose curse (as legend informs us) was effective in meting out stern justice to the violators of the laws of humanity. With her curse upon the Brig and its crew, she marked its course as it sailed out of Plymouth Harbor, and as she watched, it sank from sight before her eyes.

If our Government has fostered practices which make possible the executions of our Giteaus and the trials of our paranoiacs, just and honest criticism is the best remedy in removal of the curse, and elevating justice in its medico-legal relations.

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DISCUSSION

DR. LANE: Her counsel said if the District Attorney wants to prove her insane, that isn't my job. It was claimed that there was a bargain with the District Attorney that if she was examined I was to be present. One day the telephone rang and her counsel's office was called. Mrs. Eaton said, "What are we going to do?" There are two alienists here sent by the District Attorney. She kept them busy for an hour but said nothing. Well, counsel was angry and had some very uncomplimentary remarks about the District Attorney. He jumped into his car and went down there, but I didn't go, and that was the end of that.

The same thing was tried in the Cunningham case. The District Attorney was all ready to tackle the question of Mr. Cunningham's sanity. But he was acquitted. Neither side would raise the question.

There are little side shows connected with all these things. Mrs. Eaton employed a nurse to watch the Admiral, and that nurse came under my care. She had an acute goiter. She had been taking care of the Admiral, and then she went back to a private family, and the man in the family was a good deal of a jollier, and he said, "You are going to be a witness in a murder case." The question arises as to whether fear of giving testimony at a murder trial can be an etiological factor in goiter.

I also met later, a newspaper correspondent who wrote up the case for the press, and the judge complimented her on her wonderful powers of description. So I came in contact with the case in several ways. But I never saw Mrs. Eaton.

The nurse told me of her belief that she (Mrs. Eaton) was undoubtedly insane. She would kick her under the table and tell her not to touch the food, that it was poison. She got so nervous and upset that she quit. She was employed by Mrs. Eaton ostensibly to watch and care for the Admiral. So it looks as if she really believed it to be true at the time.

I remember that at the time in the papers there was some question in my mind as to whether some other person might have administered the arsenic.

DR. OSGOOD: That question was raised.

DR. LANE: I didn't see her, I didn't testify. The case went by default. If she had talked or I had been able to get a good history, I think there is no doubt but what she would have been acquitted because of her mental status.

DR. OSGOOD: I wonder whether she may have done any harm these last twenty years. The man who brought this case to my attention is here. Doctor, I wonder if you want to make a few comments on it.

DR. FRAME: I don't know that there is much that I can say. But I think that you were wrong in stating that an hour after the Admiral died, I called you, because I called you immediately, I think, unless you have a different record.

DR. OSGOOD: I have a record and I think that is substantially what I said. I think you thought it over for a while and then you called me.

DR. FRAME: I can say another thing, too. A few months ago, the youngest daughter, Dorothy, had been visiting in town and one day I met her in the Judge's office. She said, "Why, how do you do, Dr. Frame?" I turned around and saw her and I knew her at once. I didn't inquire for her mother or sister.

DR. OSGOOD: Have you some comments, Dr. Boos?

DR. BOOS: The paper that our President has read is very instructive, and I was particularly interested in the matter of the quantity of arsenic in the stomach. Now, he is absolutely right in saying that the quantity may be very, very high and still the case be one of murder and not suicide.

I remember distinctly one case which was referred to me by Dr. Magrath in 1919. It was known as the Archook case. It never came to trial in the Superior Court. The case was that of a foundry worker in Chelsea, who went to work very early. I think that he went on a very early morning shift, something like three or four o'clock in the morning, and it was his habit then to take some sort of meal at about eight or nine o'clock. His wife would prepare sandwiches for him, and, as a rule, coffee, and on this occasion, she had done the same thing. Very soon after he partook of the meal, he said to a fellow worker, "I don't feel well. I feel sick. I have a terrible pain in my stomach." And around ten o'clock he went home, not being able to work any more. They called in a physician, a local physician, who said, "Oh, he will be all right. He has just got a belly-ache." But an hour and a half later, he was dead.

Dr. Magrath, in investigating the case, thought that possibly he might find something in the man's clothing; his overcoat was hanging in the hall. He found in his overcoat the bottle which he had taken to work that morning. It was an ordinary pint whiskey flask, about three-fourths full of coffee, but at the bottom of the flask there were nearly two fingers of a white residue, which was white arsenic.

Archook's stomach was preserved by Dr. Magrath. It looked not like an arsenic stomach, but like a cyanide stomach. There had been a tremendous action on the stomach, and the action ceased just at the pylorus. All through the mucous membrane of the stomach, you could see the arsenic. There were certainly nearly seventy odd grains present in the stomach. But the case never came to trial. I testified in the Municipal Court in Chelsea, but the case ended there. The reason why his wife was never tried was because the police could not find out where the arsenic had been bought. They felt that they didn't have any case.

There are two other cases, now pending, of a similar nature. The police cannot determine where or by whom the arsenic was bought. Those cases, too, may not come to trial. There are, of course, so many ways to get arsenic, that I shouldn't think it would be very important to prove the sale.

The young woman who was Archook's wife had seemed to have an interest in a chap who had not been overseas, but who was in uniform; a handsome, young Pole, and it was assumed that there was a reason why she wished to get rid of Archook.

Both the wife and her alleged lover were confined in the Charles Street Jail, and the police tried very hard to get statements, but without success. One day the alleged lover found an opportunity to jump from one of the upper tiers down into the great hall below, and he died as a result of the fall. But he died in the Massachusetts General Hospital, and he didn't die without the opportunity of making an antemortem statement. The police did not ask him for one, but the House Officer at the Hospital asked him, "What did you do it for?" He said,

"Oh, what difference does it make?" and he never talked after that. Mrs. Archook married again and is living happily with her family.

In this case, the stomach received a tremendous whack from the arsenic. I have never seen another arsenic stomach so spectacular as that one.

As regards the insanity plea in these cases, I think that the following story will interest you. There is a little Polish colony at North Hadley near Northampton, and in this colony there lived a man and his wife by the name of Tomaskiewicz. One day the husband became very ill, but in spite of his illness, his wife practically threw him out-of-doors. So he went to the house of a neighbor who happened to be the most intelligent member of the community. He was a Pole who kept a small store in the Polish Village. Tomaskiewicz went to his house and complained of feeling very, very ill, and went to the toilet. Here he had severe vomiting and diarrhea. The man of the house telephoned for the police and told them that he thought there was something wrong with this man, that he had probably received poison. Dr. Lane, the City Physician of Northampton, came down to see the man and made a diagnosis of arsenical poison, a very fine piece of work. Tomaskiewicz was sent to the hospital and died there a few hours later. I received the organs and found arsenic in them all.

Then the neighbors began to talk. They said that this woman had been married to Tomaskiewicz only about a year, that she had another husband before that and that he had died rather suddenly, too. This husband's name was Peter Belos and in his body was found much arsenic. Then they said that before she came to North Hadley, she had lived in Pittsfield and had had another husband there and that he, too, had died very suddenly. This husband's name was Anthony Darmutka. Dr. Colt exhumed him and again I found much arsenic in the man. At this point the District Attorney, now Judge Hammond, said that we must not find more husbands with arsenic because if we did, the jury would be sure to say that she was insane. She probably had had six husbands in all, and five of them died from arsenic. One of them, only, escaped and he was a trial witness for the State. I have forgotten his name, but he had been the husband just previous to Peter Belos. He lived with his wife at North Hadley and one day he was taken frightfully ill and was sent to the Northampton Hospital. He was there one whole year with signs and symptoms of a very bad peripheral neuritis, but he finally recovered. He felt sure that his wife had handed him something, but, of course, he had no proof. When he got out of the hospital, he went back to the house. His wife seemed glad to see him and said, "Oh, there you are. Come in and let me give you some good soup." But he said, "No soup, thank you." He took some money which he had hidden and disappeared. They found the man in New Haven and brought him on for the trial. The police had him living in a suburb of Northampton and his whereabouts were kept very secret. All through the trial Anna, the defendant, was very placid, nothing seemed to disturb her. She sat in the Court Room and smiled and was apparently quite happy. When they called this witness, her former husband, she turned and she beamed when she recognized him. He went on to testify. He was asked if Anna Tomaskiewicz were his wife, and he said "No". The District Attorney thought something had gone wrong. But finally it occurred to him or to somebody who told him, that they were Catholics and that this woman could not marry again with her husband living. So that was the reason he said Anna Tomaskiewicz was not his wife. But when they gave her his name and asked, "Is she your wife?" he said "Yes."

Anna was found not guilty by reason of insanity. I don't know anything about insanity, but in this case Dr. Houston testified for the State and said that in his opinion this woman was not insane, that she merely had the mentality of a child about twelve years old. But the attitude of the judges is, of course, that you are sane or insane and so she was finally declared insane. It is interesting to note that she was put under Dr. Houston's care, and remained there till three years ago when she was transferred to the Bridgewater Hospital for Criminal Insane.

One of the two cases that are pending now, you may I think, have read about; it is the Gautreau case. The case is not complete as yet, but it is known, of course, that arsenic was found in Mrs. Gautreau's body. Gautreau came in one morning in January, 1933, and found his wife dead in her cabin. He called a physician apparently in great distress and said something like this to him: "You had better make sure she hasn't poison in her." The attending physician assumed that she had died of coronary sclerosis, signed the death certificate and she was buried. But there was so much talk in the community about Mrs. Gautreau's death that finally Mr. Cregg found himself obliged to have the body exhumed. The body was taken up in September, 1933, and this body, ladies and gentlemen, again held lethal arsenic. There was even more arsenic in this woman than one finds in the average case of homicidal arsenic. The Gautreau case was one of Dr. Simpson's cases.

The other case was referred to me by Dr. Reed of Andover. A young woman had died rather suddenly. There was a young man who was very much interested in her; in fact, they were engaged to be married. There was a suggestion that she was pregnant, or he thought she was and she thought so too. But they didn't want to get married just yet and so they went to see a woman who makes a business of taking care of cases like that. She gave the girl some medicine to take, in fact, Dr. Pierce's pills. I have some of them to show you, if you haven't seen them. The girl took a lot of those pills, the woman injected alcohol and glycerine into her uterus and she started to flow. So they went somewhere to celebrate, I think, at the house of a friend, a friend who had advised them about this woman. They were very happy. At midnight this girl's fiancé went out and got her a cup of coffee. Then he took her to her house and she went to bed. She was ill during the night with vomiting and diarrhea, but she was able to sit up in the morning and her lover had promised to come and call. She sat by the window watching for him. But he did not come and finally her eyesight grew dim and she said, "I can't see any more." They put her to bed and within an hour she died.

I found this to be another case of death from arsenic.

Now, the distribution of arsenic in the system is a very interesting thing. Sometimes it is a question which are the best organs to examine for arsenic. It varies greatly. The liver always shows it, but not always the most. One organ, however, which is extremely consistent is the small intestine.

I have here some figures from five cases which might be interesting. The small intestine in the Philipiak case contained .008 parts per thousand.

In another case referred to me by Dr. Walsh of Fall River, there was exactly the same amount in the small intestine, and I found the same amount again in Dr. Reed's case, that is to say, the young woman, about whom I have told you.

The Gautreau case is remarkable for the fact that the spleen contained more arsenic than I have ever found in any one of the internal organs, not to speak of the spleen itself. The Gautreau case was an embalmed case, and we expect as a rule to get results which differ from those obtained in cases which are not embalmed. The embalmed organs are dryer, they lose considerable moisture in the embalming and therefore the relative amount of arsenic may be higher. In most cases the lung is a very good organ for arsenic. The heart also contains usually an amount which is useful in estimating the total quantity and the kidney is a very consistent organ.

In the Philipiak case, it was possible for me to find arsenic in the heart's blood. That is always very important, because if the arsenic is actually circulating in the blood, it must have been recently administered. I mean, if enough arsenic has been administered so that you can find it at all. I have tried to determine it in many cases in the heart's blood. But in this case, I found a considerable quantity. I used one hundred cubic centimeters for the determination. As I have said, the presence of arsenic in the blood is significant of very recent administration. Of course, if you can find it in large quantities in the stomach contents, that, also, is significant of recent administration.

In all homicidal arsenic cases, gentlemen, it has become necessary for the government to try to show that the organs of the decedent actually contain an amount of arsenic which constitutes a fatal dose, that is to say, you must be able to show that the body contained from 2 to 3 grains of arsenic. The very presence of arsenic in any one organ ought to be sufficient to show poisoning. But there are exceptions.

I had one case referred to me from New Hampshire where it was a question of aluminum poisoning. This man's liver contained an enormous amount of aluminum, but the liver also contained a considerable amount of arsenic. However, the liver cells did not show the changes which go with arsenical poisoning. In all arsenic cases, the histological examination of the liver is of the utmost importance, and the evidence of its destructive action on the cells goes hand in hand with the presence of the poison in the system.

The brain contains at times a fair amount of arsenic. In one case, a case which was referred to me by Dr. Geary of Fitchburg, a case of death from arsphenamine, the brain showed ten times as much as is usual in the brains of homicidal cases. Why, I don't know. All the organs showed arsenic, but the brain showed an unusual amount. The amount usually found in the brain is from .0003 parts to .0008 parts per thousand.

PRESIDENT OSGOOD: I omitted to mention that the source of this arsenic found in the Admiral's stomach was never ascertained.

I wish to thank Dr. Lane and Dr. Boos for this valuable contribution to my paper.

DR. BOOS: Another thing that is tremendously important is the burning sensation in the stomach. The pain might come, of course, from eating something that you shouldn't have eaten. But the peculiar burning and the excessive thirst are both very characteristic of arsenical poisoning.

DIRECTOR OF DISTRICT HEALTH ADMINISTRATION

City of New York
Municipal Civil Service Commission
Municipal Building
Centre and Chambers Streets, Fourteenth Floor

The Municipal Civil Service Commission has extended the time for the receipt of applications for Director of District Health Administration, Grade 4, for an additional period of three weeks beginning at 9:00 A.M. on Thursday, July 12, and ending at 4:00 P.M. on Thursday, August 2.

Candidates who filed applications for an examination for this position between May 10 and May 31 need not file applications again.

At the time of the Written Test (Duties paper), each candidate must present his license to practice medicine. Licenses to practice outside New York State must be endorsed by the Board of Regents of the University of the State of New York before the names of the holders of such licenses will be certified for appointment.

Salary: $6,500 per annum.

Vacancies: There is one vacancy in the Department of Health.

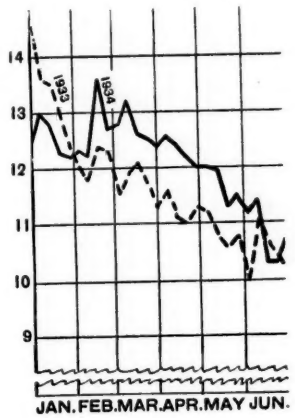
For full information apply to Martin A. Healy, Secretary.

MORTALITY RATES

Telegraphic returns from 86 cities, with a total population of thirty-seven millions for the week ending June 30, indicate a mortality rate of 10.8 as against a rate of 10.2 for the corresponding week of last year. The highest rate (19.4) appears for Memphis, Tenn., and the lowest (4.9) for Somerville, Mass. The highest infant mortality rate (13.7) appears for Richmond, Va., and the lowest for Bridgeport, Conn., Cambridge, Mass., Camden, N. J., Duluth, Minn., New Bedford, Mass., New Haven, Conn., Somerville, Mass., and Tacoma, Wash., which reported no infant mortality.

The annual rate for 86 cities is 12.1 for the twenty-six weeks of 1934, as against a rate of 11.5 for the corresponding period of the previous year.

The chart below shows the rates for the first six months of 1934 as compared with those of 1933.



NEW HAMPSHIRE MEDICAL SOCIETY

SCIENTIFIC SESSIONS

Manchester, Tuesday, May 15, 1934

THE One Hundred and Forty-Third Annual Meeting of the New Hamphire Medical Society was held in the Ballroom of the Hotel Carpenter, at Manchester, New Hampshire, on Tuesday, May 15, 1934, at ten o'clock in the morning, with the President, Dr. Robert J. Graves, presiding.

PRESIDENT GRAVES: *Gentlemen of the New Hampshire Medical Society*—It is my duty to call this meeting to order for the One Hundred and Forty-Third Annual Meeting of the Society.

I have the honor to present to you the Reverend Erville B. Maynard, Pastor of the Grace Church at Manchester.

REV. ERVILLE B. MAYNARD: O God, our Heavenly Father, who hast ordained that men serve Thee through the blessed ministry of healing, we beseech Thee to send Thy blessing upon this assembly. Enlighten us more and more by the light of Thy everlasting Gospel, increase in us the love of the truth, nourish us in all goodness, and of Thy mercy, keep us in the same, O Blessed Spirit, that in Thy name we may minister to all men of Thy healing gifts.

O Thou Who hast taught us in Thy blessed word, that Thou dost not willingly afflict or grieve the children of men, attend the beds of all who lie in suffering and pain. Uphold the hands of those who administer the sacraments of medicine and surgery, and consecrate their labors, that their days may be spent in Thy sight and to Thy glory.

Deliver many from the perils of common scourges, and give strength and skill to all whose devotions are directed to study in class room and laboratory. And grant that, perceiving how frail and uncertain is human life, we may apply our hearts unto that heavenly wisdom which leadeth to eternal life. Through Jesus Christ, Our Lord. Amen.

PRESIDENT GRAVES: It is my pleasant duty to welcome one of the few doctors who has succeeded in finding economics and medicine as a dual profession.

I have the pleasure of calling upon His Honor, the Mayor, to welcome us to Manchester today.

HON. DAMASE CARON, M.D.: *Mr. President, Reverend Father, and Members of the New Hampshire Medical Society*—In behalf of the citizens of Manchester, I extend a cordial welcome to the New Hampshire Medical Society on the occasion of its one hundred and forty-third annual convention.

For the third time in three years, as a member of the medical profession in the capacity of Mayor of the City of Manchester, I have the privilege of welcoming your convention. I feel, therefore, doubly happy in being a doctor, and permit me to say also in being the Mayor of the Queen City of New Hampshire.

I sometimes wonder if the relatively mild climate of New Hampshire, with our mountains and seashore, our deep forests, our lakes and rivers, are not the best preventives against all kinds of diseases.

Human organism, however, is frail and needs the help of the medical profession. Health, happiness, and life itself depend upon our ability to diagnose a condition, to apply the specific remedy, to keep our nerves steady and our minds clear. To us has been entrusted the almost divine art of healing the sick, ushering into the world a new life, and giving peace to an earth-tired spirit. And because of this sacred trust it is our duty not only to fit ourselves for the work, but to do all in our power to advance the science of medicine. We should encourage, advise and assist those who are fitted for its practice, and forever drive from the fields of medicine and surgery those who are a menace to life and health and an insult to our noble calling. We must be constantly alert and studious in order to keep abreast of scientific research, that those who are depending upon us for health and strength may not be betrayed, and that our profession may profit through our efforts. It is for all of us a source of great satisfaction that the medical science in New Hampshire has made progress with leaps and bounds over a period of nearly a century and a half, and that at the present time it stands comparison with the progress made in the neighboring states.

I told you last year that the City of Manchester possesses a great many rare features. We have a low death rate among our population, which proves that it is the safest city in which to live. We have a few, I might say many, octogenarian physicians, and this is not said to discourage the young ones from coming and establishing themselves in our city. There is always room for more physicians and I wish you all to stay in convention until after election. You have come to Manchester for the last three years, therefore we will give you the right to vote.

The Board of Health informs me that the inspection of hotels and restaurants is made regularly, so you may rest assured that the food

that will be served to you during your stay here will be of the very best quality.

I was told the other day that a farmer visited Manchester for the first time and was much interested in the schedule of meals which reads as follows: We serve breakfast from six to twelve; luncheon from twelve to four; tea from four to six; and dinner from six to twelve. "For God's sake," said he, "when do we see the city?"

I trust that you will find a moment to visit our city, which is built upon the slopes of the banks of the Merrimack River. You will find hospitals with the latest equipment, beautiful churches and schools, the Carpenter Library, the New Hampshire Historical Association Building, the Currier Gallery of Art, the Manchester Institute of Arts and Sciences, many institutions of learning, the new Post Office, our banks, our industries, our stores, well-paved and well-shaded streets, country clubs, our airport, parks and playgrounds, lakes and mountains.

I hope you will enjoy a very fine meeting. I also hope that your sojourn here will be a blessed one. Gentlemen, the gates of our City are open and so are the hearts of its citizens.

PRESIDENT GRAVES: We thank you, sir.

We will now have the report of the Committee on Arrangements by Howard A. Streeter of Manchester.

DR. HOWARD A. STREETER: It is a privilege and a pleasure to extend to you, members and guests of the New Hampshire State Medical Society, on behalf of the Manchester Medical Association, a most cordial welcome to this City and to the One Hundred and Forty-Third Annual Meeting of the State Medical Society.

The committees of arrangements, both state and local, have endeavored to plan a program which will be profitable and also afford some relaxation.

The printed program gives full details of the scientific sessions.

The Tuesday evening social promises a real treat for those who attend.

The anniversary chairman and the banquet committee have overlooked no detail to make these exercises long to be remembered and request you to purchase tickets as early as possible.

The financial success of this meeting depends in no small degree upon rented space for exhibits. The exhibit committee has endeavored to sell space only to those firms whose rating is beyond question and whose methods of conducting their business merit approbation. Give salesmen an opportunity to demonstrate their wares, and more important, remember the firm name when ordering future supplies.

May your sojourn here be so profitable and pleasant that you may wish to return not once but many times, and not only at annual meetings but also on other occasions.

PRESIDENT GRAVES: Dr. Streeter touched upon the fact that there is a real party this evening. It is going to take place in this room.

The Masonic Choir is going to entertain us. Dancing and bridge and various forms of entertainment will be enjoyed. So come, and have a good time.

I realize that I come from a little town that Manchester says is dead and doesn't know it, but we have a principle in the churches up there, at least, in which we maintain that very few souls are saved after the first twenty minutes, and I must call to the attention of the speakers that twenty minutes is the limit for speaking and five minutes for discussion.

We will open the Scientific session with the subject, "Prolapse of the Uterus During Pregnancy," by Dr. Donald E. Higgins of Epping, to be discussed by Donald W. Leonard, Exeter, John F. Holmes, Manchester, and Abram W. Mitchell, Epping.

The following two papers were also read:

"Report of a Case of Phenobarbital Poisoning," Bernard P. Haubrich, Claremont. Discussion opened by Henry C. Sanders, Jr., Claremont, Charles F. Keeley, Claremont.

"Bone Tumors with Report of Two Cases of Benign Giant Cell Tumor and Their Treatment," Herbert L. Taylor, Portsmouth. Discussion opened by Ezra A. Jones, Manchester, Samuel T. Ladd, Portsmouth.

TUESDAY AFTERNOON, MAY 15

The Session re-convened at two o'clock in the afternoon.

PRESIDENT GRAVES: The afternoon session will come to order.

To have been fifty years in the practice of medicine is a big thing. To have been fifty years a member of this Society is a greater experience. We have adopted the custom of awarding or presenting, at least, a medal for fifty years of membership in this ancient and honorable Society, which is now nearly one hundred and fifty years old.

So I, this afternoon, have the very great honor of pinning what amounts to be our distinguished service medal upon Dr. Leonard Jarvis of Claremont and Dr. George E. Leete of Concord. If these gentlemen care to say anything to us, we shall be glad to have them do so.

(President Graves then awarded the medals and pinned them upon Dr. Jarvis and Dr. Leete.)

DR. LEONARD JARVIS: *Members of the New Hampshire Medical Society*—I am thankful that I have been allowed to live to be so highly honored. I thank you.

DR. GEORGE E. LEETE: *Mr. President, Members of the New Hampshire Medical Society*—It is a great pleasure to receive this honor, and I trust that many of you will receive this compliment in the future.

PRESIDENT GRAVES: Now, we have a small group of youngsters, and as I read their names, if they have been able to be present, I hope that they will stand, so that we may see them. I see one of them smiling back there, and he is about as young as any of us. In fact, I know few who are younger. These gentlemen have been in practice fifty years, but have not as yet been members of this Society for that length of time.

Dr. Walter R. Sanders of Derry.
Dr. Oscar G. Blanchard of Dover.
Dr. Charles W. Adams of Franklin.
Dr. Frank A. Smith of Lebanon.
Dr. Frank S. Lovering of Moultonboro.
Dr. Ezra Clark Chase of Plymouth.
Dr. George W. Nutter of Salmon Falls.

PRESIDENT GRAVES: Dr. Adams is the sole representative of this group of young gentlemen. Will you please say something, Dr. Adams.

DR. CHARLES W. ADAMS: *Mr. President*—I feel unequal to the task of supplementing any speech, after having heard the remarks of those who have been members of this Society for fifty years. I am very glad to be here and I am sorry that I don't show my age more thoroughly.

(Dr. Lord then took the Chair.)

CHAIRMAN LORD: During the past year, your President has been seen rather generally around the State. He has shepherded his flock well, and we, as his loyal subjects, have had occasion to listen to him once, perhaps several times.

Many new duties have come to him during the past year, and I think all of us have been very much pleased with the composure and the kindly spirit with which he has handled the many and trying problems which he has had to meet.

In looking over a program like ours, we often find, after the name of the President, usually in small print, another name, before which the title "Vice-President" is given. I have always thought the functions and the powers of the Vice-President were absolutely nothing, that he was a pure figure-head and should not be seen or heard. I have reconsidered this. The Vice-President is evidently the power behind the throne. He has powers and abilities that even the President couldn't have, and, on certain occasions, the President has to call upon him to exercise functions that he cannot.

Because of the inability of Dr. Graves to introduce himself to you, I take great pleasure in presenting our President, Dr. Robert J. Graves, who will give the President's Address at this time.

The President's Address was followed by a symposium on Pulmonary Tuberculosis with the following speakers:

Medical Aspect—Robert Deming, Glencliff Sanatorium; S. A. Petroff, Saranac Lake, New York.

Surgical Aspect—Richard Overholt, Lahey Clinic, Boston, Mass.

Roentgenological Aspect—Adelbert S. Merrill, Manchester.

WEDNESDAY MORNING, MAY 16

PRESIDENT GRAVES: The meeting will please come to order.

The first business of the morning is the reception of the visiting delegates, and the first to report is in a telegram from Carl Robinson of Portland, the delegate from the State of Maine. He wires, "Unavoidably delayed. Regret cannot attend your meeting as delegate. Please extend cordial greetings from Maine Association and sincere wishes for successful meeting. Carl Robinson."

Massachusetts is in person with two very distinguished members here in charge of our mentor, Dr. Luce of Portsmouth, who will introduce the delegates from Massachusetts. We shall be glad to have one or both say something to us.

DR. LUCE of Portsmouth: It is a pleasure for me to introduce one of these men because he was born and brought up in a near-by town, the town where I was brought up. He has emigrated to Massachusetts, but he is a product of Maine. It is my pleasure, Sir, to introduce Dr. Hanson of Northampton, Massachusetts.

DR. HANSON of Massachusetts: *Mr. President and Members of the New Hampshire Medical Society*—It is a great pleasure for me to come here personally, and it is a still greater pleasure for me to bring you felicitations from the old Massachusetts Medical Society.

I came up yesterday, very much impressed with your meeting, and was very much impressed, as your President was, with the entertainment which we had last night, and also with the size of the audience.

It is a great pleasure, indeed, to see so many doctors here. I didn't know that so many could withstand the depression of the last four years. It seems to me that we are practically the only people, and ours the only profession which has had a steady job, and I don't know just how

long before we shall have a P. E. A., Physicians' Emergency Act. But I am sure that if it keeps up much longer, some of us will feel as though we needed it.

I want to thank you for the privilege of speaking to you and greeting you. I hope that some time you will have the pleasure of coming to Massachusetts and returning this greeting.

DR. LUCE: *Mr. President*—I bring you another delegate from Massachusetts, Dr. Cunningham of Winchester.

DR. CUNNINGHAM: Mr. President—I see no reason to add anything to the graceful address of Dr. Hanson.

PRESIDENT GRAVES: We are delighted to have you here and feel very much complimented.

Are the delegates from Rhode Island here? Dr. Smith, I am going to ask you to present these delegates.

DR. H. O. SMITH: *Mr. President and Friends of the New Hampshire Medical Society*—I am very, very happy today in that I have been delegated to this very pleasing duty to present to you the delegates from Rhode Island, Dr. Westcott and Dr. Lawson.

DR. WESTCOTT: *Mr. President, Distinguished Guests, and Fellows of the New Hampshire Medical Society*—Some years ago, I had the honor of being appointed as a delegate to this Society, but at that time circumstances prevented my coming. I was disappointed, but not until yesterday and this morning did I realize just how much I missed.

Meetings of this sort, enthusiastic and well run, are really a veritable spring tonic, and I am sure that Dr. Lawson and I will return to Rhode Island refreshed and invigorated from the contacts of these two days. It gives me great pleasure, sir, to extend to this Society, the greetings and good wishes of the Rhode Island Medical Society.

PRESIDENT GRAVES: I trust, Doctor, that you will take ours back.

DR. LAWSON: I have nothing to add to what Dr. Westcott has said, except to repeat that we have been having a very enjoyable and profitable visit in New Hampshire.

PRESIDENT GRAVES: The first scientific paper of this morning will be "Friedman's Modification of the Aschheim-Zondek Test for Pregnancy," by Dr. Joseph N. Friborg of Manchester, which will be discussed by Benjamin P. Burpee, Manchester, and Lyall A. Middleton, Plymouth.

The morning program continued with the following two papers:

"Pernicious Anemia," William P. Murphy, Boston, Mass. Discussion opened by Joseph D. Shields, Concord, Clarence O. Coburn, Manchester.

"Tumors of the Breast," Dean Lewis, Baltimore, Maryland, President of the American Medical Association.

WEDNESDAY AFTERNOON, MAY 16

The session convened at two o'clock.

PRESIDENT GRAVES: The meeting will please come to order.

In years past, it has been the custom for the new President of the Society to take office when there are five or six of his intimate friends left in the hall. It didn't seem to us that that was very courteous or quite fitting for this incoming man, in so high an office, to be received simply through the kindness of his friends. Therefore, the program has been changed a little this year, and while I am not in a position to give you the full report of the House of Delegates, I can announce to you, officially, that Dr. Frederic P. Lord, Professor of Anatomy, possessor of all the qualities which go to make up a most lovable individual, has been elected President, and I have the honor, pleasure and everything else that should be said, of presenting him to this Society at this time.

DR. FREDERIC P. LORD: *Mr. President and Members of the New Hampshire Medical Society*—I appreciate the courtesy of the past President, having spoken as he did in introducing me at this time, when there are more than four or five to welcome me, and I appreciate the welcome.

I have been enjoying the privilege of being Vice-President, which is a pure luxury and absolutely innocuous.

I haven't any illusions as to the job of President, that is wished upon me. The honor, and it is an honor and I do appreciate it, is pretty nearly lost in the feeling of responsibility that comes with it.

As many of you know, I am not a practicing physician. I did practice for nearly ten years, but I have been a teacher for the remaining years of my life. Many of your problems which are closely and intimately related in your lives are not related to mine, and of them I only have a second-hand knowledge, at least at present.

I would like to say this, that there are duties, it seems to me, which are accumulating in the President's office more and more; the responsibilities are heavier. The possibilities, obviously, are greater than before. There is much ahead for me, and there are three or four things I would like to ask of you in return for the consideration you have given me. The first is that you please be patient and tolerant and the second is that you be not too critical. If you have criticisms or suggestions I would like to

have them personally. Only by that means will I have the knowledge to do my part.

Lastly, and most important, is this; if we are to be effective, there is a good deal to be done. If we are to work together we should coöperate. What I can do as President is very, very little, except as I do it with the rest of you. There are many things that you will be asked to do, and by this means alone will we get action.

I think our society needs more activity. It is only by that means that we can get what we think is best, not for ourselves, but what is the best thing for the state as a whole.

So, then, I shall need and ask for coöperation and help from many of you during the next year. What I am saying, although I have no authorization to say this, applies equally as well to the other new officers, and especially to our new secretary. I won't give away any secrets because the House of Delegates has not given its report as yet.

I have not yet recovered from the shock of Dr. Sullivan's going, nor do I yet quite realize the differences that it makes in having had a man for twenty-six or twenty-seven years, who has known the ropes so well. Now, we must have a new man. That he will be a worthy successor of Dr. Sullivan's, I do not doubt. Both he and I need all the patience and assistance and all the work from you that you can possibly give. That will be my one statement today. A year from now, I shall have more to say. I have no ideas now but am waiting to receive them through you.

The program continued as follows:

"What is Wrong with the Patient Who Feels Tired, Weak and Toxic?" Walter C. Alvarez, Mayo Clinic, Rochester, Minn. Discussion opened by John P. Bowler, Hanover, Daniel C. Norton, Manchester.

"Diagnosis and Treatment of Breast Cancer," Frank E. Adair, Memorial Hospital, New York City. Discussion opened by George C. Wilkins, Manchester, John F. Gile, Hanover.

PRESIDENT GRAVES: I think you will all agree that this has been an extremely good meeting. Primarily, that is due to the Committee on Scientific Work, and also to the brethren in Manchester who have expended so much effort in making the meeting eminently successful.

The main idea throughout appears to me to have been the stressing of more careful examination and more accurate diagnosis.

Officially, we wish to convey the thanks of the Society to the Manchester Medical Society for the splendid work they have done in putting on this meeting.

This ends the Scientific Sessions.

The Secretary read a synopsis of the meetings of the House of Delegates, after which Dr. Luce offered the annual report of the Trustees:

DR. THOMAS W. LUCE: Report of the Trustees of the New Hampshire Medical Society for the year ending May 1, 1934.

Savings bank deposits available for general use, May 1, 1933		$11,741.52
RECEIPTS FOR THE YEAR		
July 17—Received from Dr. D. E. Sullivan	$400.00	
January 3—Received from Dr. D. E. Sullivan	400.00	
January 17—Received from Merrimack River Savings Bank, 10% dividend	183.40	983.40
		$12,724.92
EXPENDITURES		
July 17—Paid Dr. D. E. Sullivan for expenses as delegate to A. M. A. meeting	$117.26	
March 26—Paid Bridges & Byron for printing prize notices	9.50	
March 26—Paid Brown & Salt-Marsh for envelopes	2.50	129.26
Leaving a balance of		$12,595.66

(Checks received and withdrawals for expenses have been handled through the Portsmouth Trust and Guarantee Co.)

The Bartlett Fund

Deposit in the Portsmouth Savings Bank, Book No. B-21110, as of April 1, 1934	$5,479.00

The original bequest ($352.11) by the terms of the will is kept as a permanent fund.

The Pray Fund

Deposit in the Strafford Savings Bank of Dover, Book No. A 42, as of January 2, 1934	$1,318.41

$1,000.00 of this must be kept as a permanent fund, the income of which is to be expended for prize essays.

The Burnham Fund

Deposit in the New Hampshire Savings Bank of Concord, Book No. 80106 as of January 1, 1934	$2,005.51

$150.06 was withdrawn last year for the two prize essays.

$1140.00 of this fund must be kept permanently, the income to be expended for prize essays.

The General Fund

Deposit in the Portsmouth Trust and Guarantee Co., Book No. 12813, as of May 1, 1934	$3,114.13
Deposit in the New Hampshire Savings Bank of Concord, Book No. 35696 as of January 1, 1934	4,794.62
Total Funds on deposit as of May 1, 1934	$16,711.67

Permanent Funds Not for General Use		
The Bartlett Fund	$ 352.11	
The Pray Fund	1,318.41	
The Burnham Fund	2,005.51	$ 3,676.03
Present funds available for general use		$13,035.64
Deposits available for general use May 1, 1933		$11,741.52
Net gain for the year		$ 1,294.12

N. B. This does not include the pension fund in the keeping of the Treasurer.

A prize of $100 from the Burnham Fund has been awarded for a paper on "Some Experiences in the Treatment of Young Diabetics." The winner is Barbara Beattie of Littleton, New Hampshire.

We have examined the account of the Treasurer and found it correctly cast and properly vouched.

(Signed)
HENRY O. SMITH,
THOMAS W. LUCE.

PRESIDENT GRAVES: This brings to a close this One Hundred and Forty-Third Annual Meeting, and I now declare it adjourned.

PROLAPSE OF UTERUS DURING PREGNANCY*

BY DONALD E. HIGGINS, M.D.†

THIS paper is the result of a very interesting case seen in conjunction with Dr. A. W. Mitchell of Epping last August and reported before the Rockingham County Medical Society in October. Before citing this case, however, I wish to review the subject in general.

While all degrees of descent of the uterus below its normal position are possible, either with or without pregnancy, it is rather unusual to see a marked prolapse, amounting to a true procidentia, or protrusion of part of the uterus beyond the vulva, in connection with a full-term pregnancy. The reasons for this are several. In the first place, impregnation of a badly prolapsed uterus is difficult for mechanical reasons and because the cervix is often badly ulcerated; then, if impregnation occurs, the growth of the fetus and enlargement of the uterus above the pelvis after the first few months tend to retract the cervix; and failing this, abortion or miscarriage practically always ends the pregnancy.

The cause of prolapse is usually some traumatic weakening or relaxation of the pelvic floor, particularly of the levator ani muscle. By far the commonest source of such weakening is a number of previous difficult deliveries, especially if perineal lacerations have not been thoroughly repaired. Falls astride of fences or other sharp objects occasionally cause such injuries. Rarely, a congenital weakness of the pelvic floor leads to the same result.

The pathology of the condition is a general stretching out of the pelvic floor, with elongation of the cervix and inversion of the vagina, always associated with a certain amount of cystocele, and usually a moderate rectocele, also. When the cervix has protruded for some time, it is very often ulcerated.

The diagnosis is seldom difficult, as it is made whenever we find a uterus which with or without "straining down" descends to an appreciable extent below its normal position.

The treatment varies according to the amount of prolapse present and the stage of pregnancy at which the case is first seen. If seen early enough, a pessary may support the uterus until the intra-abdominal growth of the uterus makes support no longer necessary. If not seen until a little later, rest in bed, with knee-chest position if necessary, may enable the pregnancy to proceed to term. If seen late, the condition may be more desperate, and such means have to be taken as are described in the following examples, including the case which is to be reported.

The number of reported cases of prolapse associated with pregnancy is comparatively small, and most of them did not go to term. In 1911 Palmer Findley[1] reported that he had collected only 140 cases in the literature up to that time. Even with the aid of the *Quarterly Cumulative Index Medicus* and its predecessors, I have been able to find only two available reports of such cases since that time. While the cases there described differ considerably from my case, I shall summarize them to show the difficulties attending this condition.

The more recent report is that of Maxwell[2] in the *China Medical Journal* for 1925, concerning four cases which had come under his notice.

The first was one in which the patient was found in labor with a mass the size of two fists lying outside the vulva. It had been out for some time, was very much swollen and laterally torn. The fetal head was not actually in the cervix but was lying at the vulva. With some difficulty and a good deal of fear as to whether the lateral tears would extend upward, forceps were applied and a living child extracted.

The second case was that of a Chinese woman who was found in labor on an earth floor, with the child's head contained in the cervix and lying outside the vulva. This condition

*Read at the Annual Meeting of the New Hampshire Medical Society at Manchester, May 15, 1934.

†Higgins—Member of Staff of the Exeter Hospital. For record and address of author see "This Week's Issue," page 137.

had lasted during the final two months of pregnancy and she was at full term. The physician was able to dilate the external os and extract the child. The mother and child made a good recovery.

The third case was one of a twenty-six-year-old primipara who had fallen from a high wall and torn the perineal region at the age of fourteen. The wound had healed by second intention in about two months. About two or three months after the perineum had healed the patient had become conscious of a mass in the lower part of the vagina, and subsequently this mass had appeared at the vulva at times. She had become pregnant about eight months before she was admitted to the Pekin Union Medical College Hospital. During the first three months of her pregnancy the mass, undoubtedly the cervix, had appeared frequently at the vaginal outlet, but had retracted of itself when the patient was recumbent. During the fourth and fifth months it had been replaceable with difficulty, and after the fifth month, not at all. At the onset of labor the cervix, containing a large portion of the head, was entirely outside the vulva. The patient had remained in this condition for four days before being sent into the hospital.

On admission there was a mass outside the vulva which consisted of the cervix and part of the lower uterine segment, containing the head, the vagina being completely inverted. The cervix was dilated to about five centimeters in diameter, was dark red in color, and foul-smelling pus was coming away from it. The fetal head was soft and the fetus manifestly dead. Craniotomy was done and the fetus delivered, the cervix being very resistant to dilatation. This patient died on the sixth day after delivery, from septicemia, culture showing Streptococcus hemolyticus.

The fourth case was a para three, thirty years old, admitted to the hospital three days after the onset of labor. Five years before, she had had a full-term child which was normal and lived. Two years later she had had an eight-months baby which had died when three days old, and at that time had had an acute inversion of the uterus which had been successfully replaced. Since then, however, there had been prolapse, the cervix frequently being at or outside the vulva. During the last two months of the present pregnancy the cervix had been entirely outside the vulva, and the condition had been made worse after labor started. On admission the cervix was found stretched over the head, the whole mass lying outside the vulva. The cervix, which could not be dilated, was incised and a living child extracted. The incision subsequently tore somewhat, but the patient recovered.

The other report was one by Harris[3] in the *Journal of the South Carolina Medical Association* in 1912. The patient was a white woman, forty-three years old, who had seven living children and who had had two abortions in the past five years. There had been a great deal of hemorrhage with these abortions. Prolapse had been present for ten years, and had been progressive.

When first seen by Dr. Harris, she was five months pregnant. She had been in bed, with her hips elevated, for one month. Physical examination showed the cervix to be three or four inches long, with the vaginal walls completely everted. The body of the uterus was about the size of two fists, and the cervix was badly ulcerated. The pelvic floor was badly torn and relaxed.

To quote Dr. Harris, "A complete hysterectomy or Porro's operation was done with the best of results. The patient left the hospital in thirty days and has been perfectly well ever since."

We now come to the author's case, which was different from the foregoing cases in that the pregnancy was at term, the head was not in the cervix, and the progress of labor made it impossible for the cervix to dilate enough to allow any type of delivery from below.

The patient, aged thirty-eight years, was a para four, having had a normal delivery of a stillborn child in 1924, a living child delivered normally in 1925, and another in 1927. Following the birth of the second child there was a slight prolapse, which increased considerably after the birth of the third child but did not interfere with its delivery. After that time there was occasionally procidentia, and after January, 1933 it was almost constantly present. Her last period was in November, 1932. Her previous history was essentially negative except for a left inguinal hernia, repaired at the Elliot Hospital about twenty years ago.

She was first seen by Dr. Mitchell on August second complaining of labor pains. At that time the cervix was protruding from the vulva and was markedly edematous, but could, with considerable difficulty, be replaced. That evening she was transferred from her home to the Rockingham County Infirmary, but when seen there the cervix had again fallen outside the vulva, and could no longer be replaced.

She continued to have painful uterine contractions at about ten-minute intervals, but in spite of elevation of the foot of the bed, assumption of the knee-chest position, and repeated attempts by both Dr. Mitchell and me, the cervix could not be replaced and on the contrary was becoming still more edematous. Finally on August fifth we decided that delivery from below would be impossible, and the patient was transferred to the Exeter Hospital.

On admission, physical examination showed a large, rather pale middle-aged woman, with poor teeth and flabby musculature. The heart and lungs were essentially normal. The abdomen was somewhat flabby, with the fundus of the uterus reaching to about three inches above the umbilicus. The position was a vertex, probably L. O. A., the head not fully engaged in the pelvic brim. The fetus was active, but the fetal heart-beat was not made out. The cervix and lower segment of the uterus protruded about four inches beyond the vulva in

a cyanotic, edematous, ulcerated mass about three inches in diameter, and could not be replaced.

On the following morning, under ether anesthesia, Dr. John Holmes of Manchester did a Porro Caesarian hysterectomy. Through the kindness of Dr. D. W. Leonard of Exeter, who will shortly show the moving pictures he took during the operation, you will see its various steps. (I might take this occasion to correct an error in the program as printed. Dr. Leonard, while he is a resident of Exeter, has no connection with Phillips Exeter Academy.) The child, a five-pound girl, was somewhat narcotized at birth but has since prospered and at two months weighed eight and one-quarter pounds and was steadily gaining. At present she is of normal size for her age and has three teeth. The mother made a rapid recovery with very little discomfort. Her temperature never went above one hundred degrees, and was never above normal after the one drain was removed on August ninth, three days after the operation. On discharge from the hospital, three weeks after the operation, the abdominal wound was entirely healed. At present the patient is doing all of her housework and both seems and feels well. Examination in October, two months after the operation, showed the cervix to be of normal multiparous size, with the ulcerations practically healed and no tenderness present. The cervical stump was firmly attached to the anterior abdominal wall at the lower pole of the operative scar. There was slight cystocele and a moderately marked rectocele. Five days ago she was again examined and the cervix was found to be firmly attached to the anterior abdominal wall, normal in size and consistency, and without ulceration. There is a moderate cystocele and a pronounced rectocele, a pouch two and one-half inches in diameter bulging out of the vagina when the patient strains down. There is no discomfort, however. Undoubtedly this patient should have a plastic repair, but she is getting along very well without it.

The moral of this case, as I see it, is that we should preach to our patients the value of prenatal care. This woman had not seen a physician at all during her pregnancy, in spite of her marked prolapse. Early care, with avoidance of walking and strenuous lifting, might very well have allowed her to have a normal delivery instead of getting into the desperate condition existing when she entered the hospital. While her rapid recovery far surpassed our fondest hopes, another patient might not be so fortunate. Also, while this complication of pregnancy is luckily rare, there are others, which are all too frequent, which might also be prevented if detected in time, and concerning which it is most certainly our duty to educate our patients.

REFERENCES

1 Findley, Palmer: Prolapse of the uterus complicating pregnancy. J. A. M. A. 57: 2131, 1911.

2 Maxwell, J. P.: Prolapse and pregnancy. China M. J. 39: 479 (June) 1925.

3 Harris, J. C.: Complete prolapse of the uterus, complicated with pregnancy. J. South Carolina M Assoc. 8: 248, 1912.

(Dr. Leonard then showed moving pictures on the subject of "Prolapse of the Uterus During Pregnancy.")

DISCUSSION

PRESIDENT GRAVES: We are certainly indebted to Dr. Leonard for the very fine film presented on this subject.

The discussion will be opened by Dr. John F. Holmes of Manchester.

DR. HOLMES: It is certainly a great pleasure to see this film, and I think it is only fair for you to know that it is Dr. Leonard's work. He made those diagrams and built up that film. I certainly must congratulate Dr. Leonard upon this fine work.

I would also like to congratulate Dr. Higgins, not only upon his paper, but in the development and preparation of the case.

When I arrived at Exeter, the case was diagnosed and the proper procedure was outlined for me to follow, and there was only one thing to do. So, the real problem was solved by the men on the job, which shows the common sense that is possessed by the New Hampshire medical men.

Now, the discussion that I will burden you with for just a moment or so is the matter of Caesarian hysterectomy, which appeared to be the right thing to do in this case.

Williams, according to Phaneuf, has divided Caesarian section into five periods, the first beginning with the earliest times, because section has been practiced since that period. We know of the advent of Julius Caesar, and according to Shakespeare, Macduff was thus brought from his mother's womb. So it was an old procedure, and up until the beginning of the sixteenth century, it was carried out, according to their best judgment, without very much regard to asepsis, and the mortality was very high. From the beginning of the sixteenth century to 1876 when Porro developed this, or established the Caesarian hysterectomy, DeValli of Italy had performed this operation a hundred years previously, and Blondell, in 1823, did this operation on rabbits, and Storer of Boston did this same operation in 1868. But it remained for Porro to really establish the operation, in order to lessen the terrific mortality from Caesarian section. It is to remove the foci of infection.

Now, from 1876 to 1882 when the classical Caesarian was established, Porro's operation was done many more times than now. Then Francks finally established the extraperitoneal section, which is the fifth period given by Williams.

It is a surprising fact that when you study the literature you find that Porro's operation carries a lower mortality than the extraperitoneal section of Francks, and the reason is this: In the Porro operation, you remove the foci of infection, and in the extraperitoneal of Francks, you do not. You leave the infected uterus in the body and leave that much danger. Porro removed the uterus by delivering it from the abdominal cavity first, and then surrounding it with a rubber tube and removing the child and subsequently removing the uterus. And then finally, Porro fixed the stump of the cervix into the anterior abdominal wall and drained it. Others have covered the stump and dropped it back into the abdominal cavity. Some have cut off the entire blood supply and removed the uterus before removing the baby. There are many modifications.

Phaneuf recently reported twenty-five Porro operations, without a single maternal death, and the death rate of the children was very low.

Now, there are two points in this particular operation that I would like to emphasize. One is the application of some antiseptic to the vagina prior to operation and to the stump of the organ at the time of operation.

The particular method that I have used in this case was to fix the stump of the cervix to the anterior abdominal wall. So far as I know that method is original. I developed that several years ago for fixing these obstinate stumps of the uteri to the anterior abdominal walls. The principle is this, the use of tongue sticks outside of the abdomen, over which, after they are wound with gauze, are tied the sutures coming from the stump of the uterus, hard up under the abdominal wall, and at the same time, the stump can be pulled and caught around the edges.

In this case, we tipped the uterus outside, closed the peritoneum to the stump, and practically did an extraperitoneal operation, prior to or after the delivery of the uterus.

PRESIDENT GRAVES: I will now call upon Dr. Mitchell to discuss Dr. Higgins' subject.

DR. ABRAM W. MITCHELL: *Mr. President, Distinguished Guests, and Members of the New Hampshire Medical Society*—I have difficulty in talking, but I will do the best I can.

I shall take but a very few minutes in discussion of this interesting paper by my valued associate, Dr. Higgins. You will all agree that the case was unique, the operation imperative, successful, and the result was all that could be expected. It has been discussed by Dr. Leonard and Dr. Holmes, the chief operator, and we are now anxious to hear comments and suggestions by others. I did only a little planning and a lot of heavy looking-on until rewarded by the two-hour task of infant resuscitation.

PRESIDENT GRAVES: The paper is now open for general discussion. Are there any members present who would like to discuss it?

DR. FOSTER of Manchester: I wish to say a word about this fine work. It seems to me that the right thing was done at the right time, and I believe that in an instance like this, there is only one procedure, and that is to do a Caesarian, and at the same time a hysterectomy. I wish to congratulate Dr. Higgins, Dr. Holmes and Dr. Leonard.

PRESIDENT GRAVES: Is there any other discussion?

DR. PAUL DYE: I wonder whether this type of operation could be used in certain cases of puerperal sepsis. I call to mind a recent case of a young woman twenty-five years of age, who had evidences of some infection of the uterus prior to actual delivery of the baby, probably due to poor hygienic conditions in her home and thoughtless sexual indulgence on the part of her husband. This young woman delivered herself prematurely of a three-pound baby, and immediately after the baby was delivered she had a chill and a fever. There was no evidence of any intercurrent disease, such as influenza, throat or kidney infection, but the lochia that came from the uterus shortly after the delivery of the child was very foul-smelling.

Now, this case was treated with the usual measures of rest in bed, supportive treatment, intravenous glucose, blood transfusions and measures of that sort. She did not recover.

I wonder if, in a case of that sort, this Porro operation might have been done and possibly have saved the mother. Theoretically, so far as we can find out, the only source of infection of that mother was the uterus, and, if that focus of infection were removed, would not the mother have been saved, and might this be one possible type of case in which maternal mortality might be averted by the use of the Porro procedure?

PRESIDENT GRAVES: Is there any other discussion? If not, I will ask Dr. Higgins to close it.

DR. DONALD HIGGINS: There isn't much to say in closing the discussion, except, perhaps, to note the fact that this patient was of low mentality, which may account for her having gone so long without seeing anybody about the condition reported.

I discussed the case with an obstetrician in Boston, and he brought up the possibility of doing a vaginal hysterectomy. But, after seeing what the condition of this patient was, he agreed that the Caesarian hysterectomy, Porro's operation, was the best thing. And I certainly think so.

COMMITTEE REPORTS

NEW HAMPSHIRE MEDICAL SOCIETY

On June 20 the following four committees held a combined meeting in Concord:

1. Child Health Committee
2. Maternity and Infancy Committee
3. Lay Health Committee
4. Committee for State Medical Relief.

A synopsis of the discussion at this meeting follows:

1. CHILD HEALTH COMMITTEE

Members: Colin C. Stewart, Jr., Travis P. Burroughs, Lloyd H. Cogswell.

The Federal Government has contributed $40,000 to New Hampshire to be used during the coming year for corrective work among children afflicted with remediable defects. A survey shows that there are over 11,000 children in this group.

Dr. Syvertsen of Hanover is acting as representative of the Recovery Relief Administration in this matter.

The money will be expended in rural areas and primarily for the care of infected tonsils which are actually jeopardizing the health of a child, for the care of the teeth in children under twelve and for the purchase of glasses.

This money is to supplement that of existing agencies in local areas and will be apportioned on a basis of the number of remediable defects that are reported.

Tonsil cases must be referred by the family physician or, if there is no family physician, they must be recommended by some physician or approved by the operating surgeon. Operations on tonsils must be performed by a competent nose and throat surgeon, and, if possible, in a hospital.

An effort will be made to have the members of each County Medical Society take the initiative in this plan and be responsible for its proper fulfillment. Lay organizations may not assume the initiative and have groups of children operated on without thorough medical supervision.

If a question arises as to which doctor should op-

erate on tonsil cases, the Committee on Child Health in each County Medical Society (about to be appointed) has authority to decide.

The Recovery Relief Administration has fixed the following fees for tonsil operations:

Single tonsillectomy, $10.00.

When more than one patient is operated on at the same time:

Two tonsillectomies, $18.00.

Three tonsillectomies, $25.00.

Thereafter each tonsillectomy, $5.00.

A surgeon must make his own arrangement with a hospital about hospital charges and must pay these charges out of the above fees.

2. Maternity and Infancy Committee

Members: Robert O. Blood, Benjamin P. Burpee, Chester F. McGill.

This committee plans to work in coöperation with the State Board of Health and with Lay Organizations dealing with Maternity and Infancy.

It will study the mortality among mothers and babies so that it may offer recommendations which will tend to reduce mortality rates.

This committee may arrange some form of post-graduate instruction for doctors who wish to study the more recent advances in obstetrics and pediatrics.

This committee offers to arrange a symposium for the next annual meeting of the State Society covering these four allied subjects.

a. Prenatal care
b. Technique of delivery
c. Puerperal septicemia
d. Care of the new born.

At a later date this committee plans to issue a pamphlet for the benefit of members of the Society; it approves of the pamphlet issued by the State Board of Health entitled "Minimum Standards of Prenatal Care."

3. Lay Health Committee

Members: Frank E. Kittredge, Emery M. Fitch, Ezra A. Jones, Robert B. Kerr, Carleton R. Metcalf.

This committee recommends:

1. That in so far as possible Lay Health Medical activities shall be diagnostic and shall not give treatment.

2. That in so far as possible clinic patients shall be taken care of in the Medical Center where they live.

3. That doctors shall be notified in advance when clinics are to be held so that they may send patients to the clinics if they wish.

4. That the physician in charge of a clinic shall advise the family physician, after a patient has been seen in a clinic, regarding the progress of a case.

5. That the Lay Health Committee of the State Medical Society be disbanded inasmuch as practically all of its duties have been taken over by other special committees.

4. Committee for State Medical Relief

Members: Robert J. Graves, John P. Bowler, Clarence O. Coburn.

State Medical Relief is working better than it did at first.

Some of the County Committees of the Medical Society are not functioning so well as they should.

This committee plans to carry on without material change in its program.

A special communication from Mrs. Wilder of the Recovery Relief Administration is enclosed.

This group of committees contemplates holding a second meeting next Fall, if it seems desirable, to which State officials and officers of the several Lay Organizations will be invited.

You will find some reference to the functions of these committees in the *New England Journal of Medicine* for June 14, 1934, under the New Hampshire Department.

Carleton R. Metcalf, *Secretary.*

MISCELLANY

MARGARET PILLSBURY GENERAL HOSPITAL

The Graduation Exercises for the Training School of the Margaret Pillsbury General Hospital, Concord, N. H., were held on June 6. The speakers were Miss Bertha M. Allen, R.N., Superintendent of the Newton Hospital, and Dr. Ashley Day Leavitt, of the Harvard Congregational Church, Brookline, Mass.

RECENT DEATHS

WEYMOUTH—George H. Weymouth, M.D., aged 77, a native of Andover, died at Lyme, N. H., May 30, 1934. Dr. Weymouth, the son of Dr. and Mrs. Henry R. Weymouth, was educated at Andover, Dartmouth College and Dartmouth Medical School. Two years ago the New Hampshire Medical Society presented its gold medal to him in recognition of 50 years' continuous membership. Two children survive him.

BAKEMAN—Francis A. Bakeman, M.D., aged 59, of Franklin, N. H., died in that city July 9, 1934. He had been a member of the board of health and a practicing physician for more than thirty years.

Dr. Bakeman graduated from Hebron Academy, Colby College and Dartmouth Medical College. He is survived by a brother, Robert Bakeman, former mayor of Peabody, Mass.; two sisters, Mrs. W. N. Donovan of Newton, Mass., and Mrs. George Wing of Melrose; his widow and two daughters.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 20291

PRESENTATION OF CASE

A forty-six year old American shipper entered the hospital complaining of weakness.

Approximately ten weeks before admission the patient noticed gradual onset of weakness upon climbing stairs. This was associated with marked dyspnea and beginning loss of weight. A physician treated him with iron without relief. Two weeks later his physician put him on an anemia diet and also gave him thyroid tablets. Upon the régime he lost eight pounds in one week. The dyspnea and weakness both increased. His appetite also increased, but he had no polydipsia. During this illness he had nocturia once or twice, intermittent muscle pains, and slight stiffness of the muscles and joints, especially in his legs. The total loss of weight during the present illness was twenty pounds. He had no excessive sweating or nervousness. There was no swelling observed in the neck. There had been no predisposing emotional upsets.

His family and marital histories are negative.

He had been a shipper in a rubber plant. There was, however, no exposure to benzine.

He had always lived in Massachusetts. He denied any serious illnesses. He had had incision and drainage of a carbuncle of the left forearm about a year before admission. He had had frequent colds, often associated with pain in his right ear and some discharge. He was said to have had an attack of pleurisy lasting for two days fifteen years before admission.

Physical examination showed a well developed and nourished, somewhat plethoric middle-aged man. The skin was moist. There were dry scaling lesions on the finger tips of the left hand and on the feet. The thyroid was small and just palpable. Examination of the chest showed an occasional scattered fine râle. The heart was normal in size. There was a systolic murmur at the apex. The sounds were of good quality. The blood pressure was 150/70. The liver was just palpable and firm. There was moderately fine tremor of the extended fingers.

The temperature was 99.2°, the pulse 90, the respiration 20.

Examination of the urine was negative. The blood showed a red cell count of 4,800,000, a hemoglobin of 80 per cent and a white cell count of 10,500, with 80 per cent polymorphonuclears. The sputum was thin, mucoid in character and showed an occasional coccus. No acid-fast bacilli were observed on seventeen examinations. Eight stool examinations were negative. Five basal metabolism tests were done and ranged between plus 30 and plus 41. A blood culture was negative. A Widal was negative. A lumbar puncture was negative.

X-ray films taken in the Diagnostic Clinic two and a half weeks before admission showed no evidence of gall bladder disease. The diaphragm was normal. There was homogeneous dullness in the left lower lung field which was interpreted as a soft tissue shadow. Otherwise the lung fields were clear. The heart was not remarkable. Films taken upon admission showed mottled dullness at both bases, more dense on the left. This mottling had not changed appreciably since the previous examination. The lung roots and pulmonary vessels were prominent. There were no definitely enlarged glands. The upper parts of the lung fields were essentially clear. A film of the left mastoid showed good aeration of the sinus cells. There was slight sclerosis in the region of the antrum. The right mastoid was completely sclerosed. No air cells were visible. There was no evidence of active disease in the mastoids. Films of the skull showed a small sella. There was no evidence of tumor. The sinuses showed evidence of past infection. The frontal sinuses were small and incompletely developed. There was no evidence of active disease. There was a small round shadow along the region of the left antrum which had the appearance of a small mucocele. There was an abscess of the right upper incisor.

An ear consultant found right chronic suppurative otitis media with middle ear and nerve deafness. The drum on the right side was almost gone, the one on the left gray, with normal landmarks. A thyroid consultant did not believe the patient had thyrotoxicosis. He could not feel the thyroid. There had been no response to iodine.

The patient ran a low septic temperature, 98° to 100.5°. About three weeks after admission the temperature rose to 104°. One observer felt that the signs in the chest had increased. The heart rate was more rapid, with definite gallop rhythm. The liver was felt definitely two and a half fingerbreadths below the costal margin. It was not tender. The sputum became slightly blood streaked. A loud systolic murmur was heard in the pulmonary region. The following day an early diastolic murmur and a roughened second sound were heard at the base. There was no evidence of peripheral emboli. The gallop rhythm continued. Enlarged firm glands were felt on both sides of the neck. These increased in size during the day. There

was also swelling in the region of the right tonsil and redness in the pharynx. The patient developed edema of the larynx which completely obscured the view of the glottis. There was however sufficient breathing space. Redness developed over the upper lip, the tip of the nose, and the right cheek, suggesting early erysipelas. A neurologic consultant found no evidence of intracranial disease. On the day following the lumbar puncture the patient's temperature rose to 104° and remained elevated. He developed slight diarrhea. Three days after the lumbar puncture the temperature was up to 106° and the pulse to 150. His throat remained red and swollen, and the glands in the neck were unchanged. The diarrhea continued. The erysipelas spread somewhat. Approximately one month after admission the patient died.

X-Ray Interpretation

Dr. Aubrey O. Hampton: I think our last examination was about fifteen days before death. The first examination of the chest was one month prior to that. The chest picture is rather unusual. We spent considerable time trying to determine what it might be. It is present and almost exactly the same in appearance a month before the last examination. This dullness at the left base perhaps is a little more dense at the first examination, but it is interpreted, as the note said, as a soft tissue shadow. It looks very much like that. We thought the dullness was chiefly in the lower lobes, more on the left, a linear infiltrative type of lesion. We thought at first it was passive congestion. It looks as much like that as anything, and yet it did not change in a month. There was no fluid at the bases even after the patient became much worse. When we heard that the patient was going to die we thought it must be malignancy. At first we left the diagnosis open and just described the chest. It is certainly an obvious pulmonary lesion. It is consistent with passive congestion, with an old fibrosis or infection, resolving pneumonia, malignancy, or half a dozen other things.

I think the note about no evidence of active disease in the sinuses and mastoids is not quite accurate. It implies that we can rule out active disease in a sclerosed mastoid. We cannot, it looks so like solid bone, and we cannot tell whether there is an abscess in the middle of it.

Differential Diagnosis

Dr. Frederick T. Lord: With respect to the story here beginning three and a half months before the patient died, with weakness and shortness of breath as the most prominent manifestations, also loss of weight, muscle pains, muscle stiffness and joint stiffness, the thing that strikes me as peculiar is that two or three weeks before the history was taken an x-ray of the chest showed a pulmonary disturbance, and that under the circumstances nothing is said of cough, sputum, pain or wheezing. Is there further information about those symptoms?

Dr. James Hitchcock: He gave no history of cough at all at first, but after he had been in the hospital a while his wife said he had coughed at night. He raised no sputum.

Dr. Lord: There was no pain or wheezing?

Dr. Hitchcock: No.

Dr. Lord: No history of any acute disturbance?

Dr. Hitchcock: No.

Dr. Lord: With respect to the past history, it is desirable to know more about the pleurisy fifteen years ago. If it were a "primary pleurisy" one might suspect a tuberculous origin. Is there more information about that?

Dr. Hitchcock: No.

Dr. Lord: The physical signs were said to have increased, but it does not say in what direction they increased. In the first instance there were scattered fine râles.

Dr. Hitchcock: When he was first seen in the Diagnostic Clinic no sounds were heard. In the hospital we did hear numerous fine crackles at the left base, and they became more numerous as time went on.

Dr. Lord: Only an increase in râles, no other signs?

Dr. Hitchcock: There was no dullness or flatness.

Dr. Lord: One would like to know whether this loud systolic murmur in the pulmonic region was transmitted to the neck.

Dr. Hitchcock: That was heard in the Diagnostic Clinic. In the ward one of the doctors thought he heard a diastolic, but only on one occasion. Whether it was transmitted I am not sure.

Dr. Lord: As stated in the report there is only one blood examination. Were there other blood examinations?

Dr. Hitchcock: There were several, all negative except a terminal leukocytosis.

Dr. Tracy B. Mallory: The white cell count was 22,000 at one time.

Dr. Hitchcock: There was nothing very striking about the blood picture.

Dr. Lord: That brings me to the x-ray examination. This showed a basal disturbance with a rather homogeneous increase of density at the left base, bilateral mottling and a good deal of disturbance in the right cardiophrenic region. A lateral film might have shown something in the interlobar space.

Dr. Hampton: We have an oblique view which probably would show the septum. I think that is the apex of the heart and this is the mottling. I think the interlobar septum is showing. There is some thickening of the pleura which we did not see in the anteroposterior view.

DR. LORD: With respect to the diagnosis, he had certain skin lesions on the fingers and feet which may be epidermophytosis. He had a chronic right otitis media and an old mastoiditis, with possible sinusitis, all of which are not especially significant in explaining the fundamental disturbance. There is a question of hyperthyroidism. His weakness, moist skin, tremor and high basal metabolic rate suggest the possibility of hyperthyroidism. There was a palpable mass in the thyroid region according to one observer, but not found by the consultant, so it is uncertain. On the whole, with the absence of tachycardia and with the other symptoms, especially the shortness of breath, the high basal metabolic rate is probably due to other disturbances. He is febrile and there was no response to iodine, so that I am not disposed to regard hyperthyroidism as likely.

The weakness, the pain in the lower extremities and the mass in the thyroid region palpated by one observer might suggest hyperparathyroidism. We should like to know under such circumstances the calcium and phosphorus, but I assume we cannot know that.

DR. HAMPTON: We had a lateral view of the skull which I did not show. It showed perfectly normal bone density.

DR. LORD: In the x-rays of the thorax the bones are rather faint, but not radiant enough to suggest decalcification. Hyperparathyroidism does not seem likely.

With respect to the explanation of the pulmonary disturbance, I find it difficult. Whatever else may be the matter, he had an infection and may have had a malignant process. When malignant disease of the lung and fever are associated, the fever is usually due to an infection which complicates the malignant process. With bronchiogenic neoplasms the trapping of the infection is usually responsible for the fever. Abscess is unlikely with this mottling and without foul odor to the sputum. Tuberculosis of the lung is not likely, although it cannot be excluded. The process is basal and not apical, and seventeen examinations of the sputum were negative. An empyema of the interlobar septum seems unlikely with the lateral view showing no density in the region of the interlobar septum.

A chronic infection in the lung tissue is a probable explanation. Malignancy may be in the background. With the existing evidence it is not possible to make a definite classification of the infection. It is difficult to put the final complex together, especially with the enlargement of the liver. It seems to have occurred during a short period of observation. It was just felt at the first instance and then two and a half fingerbreadths below later, without any accompanying evidence of passive congestion.

With respect to the heart, I feel that there is no definite evidence of actual intracardiac pathology, but I am puzzled by the transient diastolic murmur.

DR. HITCHCOCK: It was heard only once.

DR. LORD: It suggests the possibility of endocarditis on the aortic valve, but the blood culture was negative. There was no purpura and there is little to support a diagnosis of endocarditis.

Regarding the immediate cause of death, the red throat and pharynx, rapidly developing cervical adenitis, the swelling about the right tonsil, the edema of the larynx and the development of facial erysipelas suggest a terminal infection due to the streptococcus.

DR. MALLORY: Dr. Hitchcock, you had the advantage of seeing this patient. Have you anything to add?

DR. HITCHCOCK: This patient was seen first in the Diagnostic Clinic. He came in with the story that you have heard, complaining chiefly of weakness of about ten weeks' duration. That was practically the only symptom, except a good deal of shortness of breath on exertion; and it developed later that he had a dry hacking cough.

On physical examination we found practically nothing to account for the symptoms. He was rather thick set, heavy, apparently a rather phlegmatic type, suggesting hypothyroidism rather than hyperthyroidism. His liver was enlarged.

On the basis of the negative physical examination and the fact that he had a slight temperature when he came in we felt that we ought to do a chest film. We also did a Graham test because of the enlargement of the liver. We also noticed before he left that when he extended the fingers he had a fine tremor. We had a basal metabolism done and it was plus forty-two. I made a diagnosis of thyrotoxicosis and wrote to his doctor advising hospital admission. When he came in another metabolism was done and it was about forty-seven. We put him on Lugol's solution, but it produced little effect. The metabolic rate dropped to plus thirty. That is the lowest it ever reached. The temperature was normal when the metabolism was done.

On admission he had a temperature, and immediately we began to hear sounds in the chest which I interpreted as a mild bronchitis and assumed would quiet down with rest and hydriodic acid and that we could go ahead shortly and do the operation. After he had been here a few days the resident surgeon went over him and said he did not think it was thyrotoxicosis and that the whole picture could probably be explained by miliary tuberculosis. I checked that up with the X-Ray Department, and Dr. Holmes said flatfootedly that it was not miliary tuberculosis. So then we considered everything. We thought that, with the systolic murmur, the loss of weight, and the temperature, subacute bacterial endocarditis had to be considered. The blood picture was not conclusive of anything. The white cell count was 10,000 or 12,000, with 80 per cent polymorphonuclears. We felt that the whole

picture might be consistent with Hodgkin's disease, although there were no palpable glands. Incidentally, the abdomen was very difficult to palpate. It was very difficult to tell how big the liver was, but I thought it was slightly enlarged. The spleen was not palpable. It certainly did not seem to be an aleukemia leukemia.

One point in the history struck me as being very important—the infection which he had in his arm. It took place I believe not so long ago as was reported in the history, about three months before the development of his symptoms. The infection began with a bite from an ant, I believe, and then the large abscess developed. It was opened with a large crucial incision. The patient was completely knocked out by the operation. He had been very healthy all his life. Apparently the operation took a great deal out of him. He went back to work immediately, but he felt that his illness began at that time. There may be something in that. I have been suspicious that he had an infection that never did get out of his system.

Dr. Weille saw him on account of the chronic ear. He was very much interested and thought there might be a brain abscess. We did a lumbar puncture and it was negative. We did a second lumbar puncture a week or ten days after that, thinking that if there were an abscess or infection a second lumbar puncture would give positive findings. This was also entirely negative, and with the negative x-rays we believed intracranial pathology could not explain the picture.

He developed this terminal condition which we believed to be a streptococcus condition, with pretty typical erysipelas, growing puffiness of the eyes, and the temperature rising steadily to the end. I was inclined to believe that he died of a septicemia, though we were unable with numerous blood cultures to find the organisms to account for it, and that the terminal condition was streptococcus in the throat.

Clinical Diagnoses

Pyemia?
Streptococcus pharyngitis and cervical adenitis.
Erysipelas.
Interstitial pneumonia?

Anatomic Diagnoses

Septicemia, hemolytic streptococcus.
Organizing pneumonia.
Erysipelas.
Sinusitis, suppurative (streptococcus hemolyticus), right ethmoid, sphenoid and mastoid.

Pathologic Discussion

Dr. Mallory: I think it was fairly obvious from the clinical history that one was dealing with two things here, the underlying pulmonary condition and a terminal septic one. The postmortem findings bear that out. The bacteriologic cultures of the heart's blood, of the middle ear, and so on, all showed hemolytic streptococcus, which one would expect with the terminal erysipelas. We were not able to get any other organisms that seemed of any significance.

The chest condition was obviously a very much older and long-standing affair, and although I can give it a descriptive name I cannot do much better than that. Both lower lobes of the lung were smaller than normal, distinctly firm when we cut into them, very dry, with a curious mottling of red and gray. They cut a little more toughly than an ordinary pneumonic lung. The microscopic sections showed a very extensive organizing pneumonia. A large proportion of the alveoli are filled with an exudate consisting of various proportions of polymorphonuclears and fibrin. In many areas there is more or less complete replacement of the fibrin plugs by fibrous tissue. It is the typical picture of organizing pneumonia that we all studied in our second year course in pathology and that we have seen very seldom since. I have no idea what the etiologic agent was. I think Dr. Hitchcock's presumption that it was secondary to the original sepsis in the arm is very possible. It may have been from beginning to end a streptococcus process. I have seen organizing pneumonia several times with streptococcus infections, but it is not peculiar to them at all. It is perfectly possible that there was some unknown organism at the base of it.

Examination of the head showed acute sinusitis on the right side, including the ethmoid, sphenoid and mastoid. The venous sinuses were free from thrombi.

Dr. E. G. Thorp: There is one other point. I talked with the patient and he told me that he had definite chills before coming into the Diagnostic Clinic.

CASE 20292

Presentation of Case

Two months before admission the patient, a sixty-six year old Irish-American housewife, developed a head cold which increased in severity. Five weeks before admission she complained of pain in the right ear. A swelling soon appeared behind the ear. A few days later a mastoidectomy was performed. This continued to drain up to admission. She remained in the hospital for about three weeks. On two occasions while in the hospital she had burning substernal pain and fear of impending death. This pain was relieved by medication. She was discharged from the hospital on the day before admission here and was brought to a relative's home near Boston. That morning a physician was called who made a diagnosis of pneumonia and advised hospitalization.

Her family and past histories are non-contributory.

Physical examination showed a small woman breathing rapidly. The skin was moist. The heart border was increased to the right. The sounds were distant, but otherwise of good quality. Examination of the chest showed limited expansion of the left chest. The lower half of the left chest posteriorly showed dullness to flatness, increased tactile fremitus, diminished breath sounds, distant spoken voice and a few fine râles. There were also a few moderately coarse râles at the right base posteriorly.

The temperature was 100.2°, the pulse 112, the respiration 38.

Examination of the urine showed a specific gravity of 1.020, with a slight trace of albumin. There were occasional white blood cells. Examination of the blood showed a red cell count of 2,100,000, with a hemoglobin of 55 per cent, and a white cell count of 6,300, with 80 per cent polymorphonuclears. The stools were negative. A Hinton test was negative. A portable film showed gross enlargement of the heart, but no evidence of lung pathology.

The day following admission the chest signs cleared, but the following day many of the râles returned. The temperature remained elevated, reaching 103.5°. On the third day the patient was irrational. An ear consultant reported that the mastoid cavity was fairly clean. The middle ear was dry. The respirations increased to 45. No evidence of pneumonia was found in the x-ray films of the chest. She was put on digitalis, but did not respond. She went downhill progressively and developed a questionable stiff neck. She was too irrational to demonstrate any local central nervous system signs. She died on the tenth day after admission.

X-Ray Interpretation

Dr. Aubrey O. Hampton: This is a very poor demonstration of the lung because of the high diaphragm and the large mediastinum. We see about half of the lungs I suppose. This heart looks enlarged in all diameters. It nearly reaches the axillary line. It is not so large as it looks. This is a portable film with a high diaphragm and probably a great deal of magnification. We do not see the usual curves of the heart, and the enlargement is certainly quite marked toward the right. The mediastinum is wide. It could be due to decompensated heart or pericardial effusion I suppose.

The pulmonary decompensation noted in the record was based on the size of the pulmonary vessels. If they are small and the heart is large we may assume that. In this case I think the pulmonary vessels are covered by the heart, so we cannot say much about the lung root.

Differential Diagnosis

Dr. Charles L. Short: It is evident in this case that the patient's condition did not allow a detailed history to be taken, so we have to rely on the rather sketchy account of what happened before she came in. The past history that is given is essentially negative. We must however remember that a patient of sixty-six years may have had advanced cardiovascular disease or even malignancy without any clue in the past history.

The story of the head cold and mastoiditis followed by operation seems quite straightforward. The first consideration is whether there was extension from the infected middle ear and mastoid in the direction of sinus thrombosis, brain abscess or meningitis. There are certainly no definite signs or symptoms of any of these conditions, and during her stay in the hospital when she was under observation no neurologic findings are mentioned except irrationality toward the end and a questionable stiff neck.

The history I obtained did not describe the postoperative course in the other hospital. Did the patient continue to run a fever after the mastoidectomy?

Dr. Knox H. Finley: Yes. The temperature was 103° to 105°.

Dr. Short: So apparently sepsis, wherever it was, continued following the operation on the mastoid.

The patient was transferred to the Massachusetts General Hospital in a very sick condition. In other words there was no sudden accident intervening after the discharge from the other hospital which led her to be brought here. She simply kept on being ill and running a septic temperature. When she arrived here she had slight fever, a pulse of 112, and a disproportionate increase in respirations. They were recorded as 38.

You have heard the physical findings. Apparently they were limited entirely to the chest. The heart was enlarged to the right and the sounds were distant, in a patient who had evidently a thin chest wall. In the lungs we have râles at the right base, and at the left base distant voice and breath sounds, dullness to flatness and increased tactile fremitus. The increased tactile fremitus would certainly be against the presence of fluid, and the heart is apparently not displaced toward the left, so collapse is unlikely.

The examination of the urine at least does not suggest any considerable degree of nephritis, with a specific gravity of 1.020 and no important findings in the sediment.

The blood showed a marked degree of anemia, apparently tending toward a high color index. The white cell count was normal. There is no description of the smear. Was there anything unusual about the smear?

Dr. Finley: I remember nothing unusual.

Dr. Short: I am forced to pass over this anemia and simply assign it to sepsis without evidence of blood disease and with no hint toward obscure malignancy or severe nephritis.

What remains now is to determine the cause of death in this patient. We are told in the

record that further x-rays were taken. Have we those films here, or is this the only one? This was taken three days after admission and shows no definite signs of pneumonia.

DR. HAMPTON: That is the only one. I think we can talk about only half of the chest, and that portion is normal as far as consolidation goes.

DR. SHORT: It is not possible by x-ray to rule out the presence of pneumonia?

DR. HAMPTON: No; particularly at the left base.

DR. SHORT: I should like to go over briefly a few possible causes of death. We have an elderly woman lying in bed since operation. I think we have to keep pulmonary embolus in mind, if not from the lateral sinus from the more usual place, one of the leg veins. Her course as I learn it now is not typical of such an accident, and we have none of the usual positive signs such as pain or bloody sputum and no definite x-ray signs in the lungs. While in the other hospital she did have two attacks of substernal pain and distress which were apparently quieted down by medication. These might have been minor pulmonary infarcts; but on the whole I do not think we have any evidence to say she died of pulmonary embolus.

The next question is whether she had coronary occlusion. Again, the only suggestive evidence of this is the attacks which she had in the other hospital. They might have been due to coronary occlusion or to simple angina. She did not die from any sudden cardiac accident and she did not die from gradual heart failure, although she was given digitalis while in the ward. Her blood pressure apparently was normal when she came into the hospital. There is no record of an electrocardiogram.

It seems to me that the cause of death must be related in some way to her sepsis. As I said before, we have no definite evidence of continued sepsis in the region of the mastoid. The ear consultant who saw her did not find any local infection there which would account for her fever and her course. She did have definite signs in her chest when she came in, mostly at the left base. By x-ray we can rule out any bilateral process, which is the usual form of bronchopneumonia. Similarly, I think the clear right chest would be against the presence of miliary septic abscesses in the lungs. It would be unusual to have them limited to one side.

We are left finally with a heart which is grossly enlarged, with the usual curves not clearly shown, with distant heart sounds in a woman who has a thin chest wall. The signs at the left base might be explained by compression from an enlarged pericardial sac. The fever and her intense dyspnea toward the end again might be explained by septic fluid in the pericardium. She did not have other definite signs of pericarditis with effusion, but at least this is one diagnosis which will explain the x-ray picture, the fever and the signs at the left base. I realize this diagnosis is one that is made more or less by exclusion and it lacks some positive evidence, but it seems to me the one that best fits all the aspects of the case.

DR. TRACY B. MALLORY: Have you anything to add, Dr. Blake?

DR. GERALD BLAKE: When this patient came in, the physical examination showed the signs that have been described. We thought the low white cell count was a bad prognostic sign. I was entirely satisfied that she had bronchopneumonia in the left lower lobe and was developing a bronchopneumonia in the right lower lobe. Three days after entry this x-ray was taken, and I was surprised that it showed such an enlarged heart. While recognizing the fact that compression might give these signs, I still was so well satisfied with the diagnosis of bronchopneumonia that I thought she was running the usual course of a terminal bronchopneumonia, and that her heart probably was due to left sided enlargement from arteriosclerosis and some degree of failure. I came out here to see the autopsy fairly satisfied in my mind that that was what would be found. I do not think I have anything else to add.

CLINICAL DIAGNOSES

Bronchopneumonia.
Draining mastoidectomy wound, right.
Cardiac hypertrophy.

ANATOMIC DIAGNOSES

Otitis media, right.
Operative wound, right simple mastoidectomy.
Acute fibrinopurulent pericarditis (streptococcus hemolyticus).
Chronic fibrous pleuritis, left.
Perisplenitis, old.
Leiomyoma of the uterus.
Pulmonary atelectasis, left lower lobe.

PATHOLOGIC DISCUSSION

DR. MALLORY: The autopsy on this case showed a greatly distended pericardium containing about 500 cubic centimeters of purulent fluid from which we grew a pure culture of hemolytic streptococcus.

The left pleural cavity showed old fibrous adhesions but no fluid. The underlying lung was free from pneumonia. The lower lobe was fairly well collapsed.

The mastoid and middle ear had evidently been pretty well cleaned up by the operation. There was no pus left in them, and the cranial cavity was entirely free from involvement.

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PERIODIC HEALTH EXAMINATIONS

FOR those who believe in the principle of periodic physical examinations and appreciate their real value to the individual, there is encouragement in the fact that they are at least under discussion again. Praise is of considerable worth; criticism is a still greater asset, and the ball that forms the basis of the contest is not likely to be lost to sight.

When, a few years ago, the health examination became the subject of a universal, if somewhat patronizing approval, it soon also became the victim of a generous but misguided enthusiasm. Its uses were not critically analyzed and its value was inflated; it was sold to the man on the street like an issue of a new stock, and its devaluation was correspondingly extreme. Moreover, and to make its tumble greater, what should have been a strictly ethical, purely professional procedure fell into the hands of the supersalesman and became tainted with commercialism. Health examinations came to be sold by the yard—the more money the purchaser had the more cloth he got—or, more aptly, examinations were graded like eggs: Western, fresh, strictly fresh and fancy, the price depending on the grade.

Somehow, and not amazingly, the intimate relationship between physician and patient which we consider one of the assets of our profession could not survive the atmosphere of the service station. The golden age of naïve enthusiasms also went by when our dream castles of a money-made millennium tumbled, and the health examination, along with other worthy objects, was debunked—unnecessarily severely. We admitted what we had known all along—that a health examination does not constitute a cheap ticket to immortality and perpetual health—and decided that we had been selling a gold brick to the public.

Actually, a properly conducted health examination, periodically repeated, is of considerable value to the individual if he understands its scope, its limitations and its purposes. It will frequently fail to expose the signs of "preclinical" disease; it can do little, if anything, to prevent the slow progress of arteriosclerosis; it will not forestall an attack of lobar pneumonia. It will often, however, teach the individual the inadequacies of the vehicle in which he is forced to complete his journey; it may serve to dispel certain secretly cherished apprehensions; it may not seldom aid in the early detection of various dangerous but curable or controllable diseases. It is far from infallible, but it is a definite offering which we have to make in the interests of positive health.

There is no reason, moreover, why the slightly spoiled practitioner, family or otherwise, should continue to overcultivate his sensitive, ethical nature. He has as much justification for advocating the health examination among his patients as the pediatrist has for recommending the same thing, or vaccination, or diphtheria immunization. If the physician has a "good thing" to offer, it is his duty to offer it, and if it increases his business so much the better for him; it is an important object of his practice.

DISEASES PECULIAR TO CIVILIZED MAN

THERE is a principle of evolution called "orthogenesis", which, by definition, states that "when protoplasm has set within it a tendency to vary in a certain direction, this change in direction cannot be stopped, and the species may proceed to extinction". In other words, the overgrowth of a certain part of the body may proceed generation after generation at such an accelerated rate that ultimately the part developed becomes an unsafe factor and even leads to the dissolution of the species. As examples of this, one can think of the great dinosaurs and,

particularly, the Irish elk. In the latter animal the horns grew to be so large that finally the weight of the antlers bore the animal down and the species became extinct.

It is a justifiable step, perhaps, to transfer this principle to man, and the author of the monograph, "Diseases Peculiar to Civilized Man"*, has attempted to do so. He, in fact, believes that the so-called kinetic system, a combination of the brain, the thyroid, the adrenals and the sympathetic system, has become, based on the principle of orthogenesis, a tissue which is tending to excessive activity, similar to the antlers of the Irish elk, and that the condition developed by this activity can be justly termed "hyperkineticism". He, moreover, attempts to control this excessive activity of the kinetic system by "rationalization", and if this is insufficient, by the performance of one or more operations, either singly or in combination, such as the removal of the thyroid gland, excision of certain sympathetic ganglia, or, mainly, the division of the nerves leading from the adrenal glands. The diseases which he attempts to cure by these operations are those which he has classified as examples of hyperkineticism — hyperthyroidism, neurocirculatory asthenia, peptic ulcer, and diabetes. These diseases are largely or exclusively in the human race and appear to be, at least in large part, of comparatively recent origin; hence the title of this monograph. Such, in brief, is the hypothesis upon which Dr. Crile has based his exposition.

One feels that there is a good deal of insecurity about the postulates, and that, therefore, the conclusions drawn from them must, naturally, be taken with considerable reservation. Is it necessarily true that we are living in an age of hyperkineticism and that our brain, thyroid, adrenals and sympathetic system are given to excessive activity? Is this activity, should it be accepted, necessarily an example of orthogenesis? Finally, will a denervation of the adrenal gland lead to a slowing-up of the kinetic system and ultimately cure a patient of his symptoms? These questions cannot be answered satisfactorily, even after a most careful perusal of Dr. Crile's thesis. When he states, moreover, that the principle of orthogenesis is so strongly at work in ourselves that we are possibly progressively involving our brain and thyroid gland in a condition of activity and speed that may lead to destruction of the individual, or in other words, that the tools which should have enabled us to reach the greatest height of civilization may turn upon us and ultimately eradicate all that has been gained, one feels that we have reached a degree of speculation which can have no true basis in scientific thought.

Should one, however, wish to know something of the embryology and development of the adrenal glands, the physiology of the adrenal system, the surgical technique of denervation, and the immediate and remote results of this operation, one can turn to this book with complete satisfaction. The operation has been performed in the Crile Clinic upon 307 patients who were, presumably, suffering from some form of hyperkineticism. Begun in October, 1913, the author has carried forward this work and has even extended it into cases of epilepsy, psychoneurosis and essential hypertension. With the latter three diseases, however, not much success was attained. The results, according to the clinic figures, in neurocirculatory asthenia, hyperthyroidism and peptic ulcer are certainly remarkable in that a report is made of improvement or cure in each of these diseases of practically 95 per cent. The effects on patients with diabetes are less satisfactory. The author, apparently, strongly believes, as the result of his dekineticizing operation, that a new principle has been introduced into medical thought and that the law of orthogenesis has been applied to medical problems.

This work is the result of a long series of studies. The weaknesses are obvious. The premises are not, by any means, acceptable. From a practical point of view, more important still is the lack of control patients. One wonders whether a similar group of patients treated by other means than operation would not have done exactly as well. That a man so widely known as the author should draw such general conclusions from work that is still obviously in the experimental stage is certainly a dangerous precedent. Too many patients and doctors will accept this work as final and proceed with the depleting operations in patients that might better be treated by other methods. Is this a good example of scientific research?

*Crile, George. Diseases Peculiar to Civilized Man; Clinical Management and Surgical Treatment. New York: The Macmillan Company, 1934. 427 pages. Price, $5.00.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

FOTHERGILL, LEROY D. A.B., M.D. Harvard University Medical School 1929. Instructor in Bacteriology and Immunology, and in Pediatrics, Harvard Medical School. Address: 300 Longwood Avenue, Boston. Associated with him is

LIUM, ROLF. M.D. Harvard University Medical School 1933. House officer on the East Surgical Service, Massachusetts General Hospital. DeLamar Student Research Fellowship. Address: Massachusetts General Hospital, Boston.

Their subject is "The Value of Commercial, Antibacterial Streptococcus Sera in Hemolytic Streptococcus Infections." Page 99.

MYERS, WALTER K. B.S., M.D. Johns Hopkins University Medical School 1929. Assistant in Medicine, Harvard Medical School. Resident Physician, Thorndike Memorial Laboratory. Address: Thorndike Memorial Laboratory, Boston City Hospital, Boston. Associated with him is KEEFER, CHESTER S. B.S., M.S., M.D. Johns Hopkins University Medical School 1922. Assistant Professor of Medicine, Harvard Medical School. Associate, Thorndike Memorial Laboratory, Boston City Hospital. Address: Thorndike Memorial Laboratory, Boston City Hospital, Boston. Their subject is "The Gonococcal Complement Fixation Test in the Blood and Synovial Fluid of Patients with Arthritis." Page 101.

BLOTNER, HARRY. A.M., M.D. Tufts College Medical School 1924. Associate in Medicine, Peter Bent Brigham Hospital. Consultant to the Weymouth Hospital. Instructor in Medicine, Harvard Medical School. His subject is "The Use of Insulin in Malnutrition." Page 103. Address: 23 Bay State Road, Boston.

MARONEY, JOHN A. M.D. Tufts College Medical School 1931. Resident Surgeon, City Hospital, Worcester. His subject is "Arthus Phenomenon." Page 106. Address: City Hospital, Worcester, Mass.

STEVENS, NEIL C. M.D. Columbia University College of Physicians and Surgeons 1915. His subject is "Auscultation of the Abdomen: An Aid to Diagnosis." Page 108. Address: Glen Cove, Long Island, New York.

OSGOOD, GILMAN. M.D. Bellevue Hospital Medical College 1886. Medical Examiner 2nd Plymouth District. Assistant Physician, Kings County Asylum. Assistant Superintendent (2 years) Kings County Hospital. His subject is "The Admiral Eaton Case." Page 111. Address: Rockland, Mass.

HIGGINS, DONALD E. M.A., M.D. Harvard University Medical School 1930. Member of Staff of the Exeter Hospital. Boston and Maine R. R. Surgeon. His subject is "Prolapse of Uterus During Pregnancy." Page 125. Address: Epping, New Hampshire.

MISCELLANY

LONGEVITY IN THE EAST NORTH CENTRAL STATES

The State of Wisconsin, so far, has made the top score of longevity among the states for which life tables have been computed in the Statistical Bureau of the Metropolitan Life Insurance Company, up to date. The list so far comprises the Middle Atlantic States, New York, New Jersey and Pennsylvania; and East North Central States, Ohio, Indiana, Illinois, Michigan and Wisconsin. Computations are still in progress for other states, and it remains to be seen whether Wisconsin can clinch the lead when the lists are closed for all the states. In the meantime, the Badger State may rejoice in having achieved an average length of life of 61.51 years for white males and 64.60 years for white females. While this is still, by several years, less than the splendid record made by New Zealand, namely, 65 years for males and nearly 68 years for females, yet it is really a very fine showing. Not so many years ago we were inclined to think of a person 60 years old as almost superannuated. Now we see that the 60-year mark is actually less than the average length of life of white males in two of the states comprised in the East North Central division, namely, in Wisconsin and also in Indiana. The white males having passed the 60-year mark, it follows as a matter of course that the white females have exceeded it by a good margin, since there is always an advantage of a few years in favor of the females. Actually, the figure for white females in Indiana is 62.79.—*Bulletin, Metropolitan Life Insurance Company.*

RECENT DEATHS

CROWLEY — JEREMIAH FRANCIS CROWLEY, M.D., aged 62, of Adams, Massachusetts, was found dead in his bedroom, July 4, 1934, after a protracted period of ill health.

He was born in Thorndike, a son of the late Patrick and Mary Crowley. His early education was acquired in the Thorndike and Palmer public schools. He taught in the grammar school of Bondsville for a year, and then engaged in the study of medicine at the Baltimore Medical College graduating therefrom in 1894. He joined the Massachusetts Medical Society in 1897.

Dr. Crowley served an internship at Johns Hopkins Hospital, and the Boston City Hospital, and later carried on practice in Adams. He served two terms on the Adams Board of Health, and was a member of the exemption board during the World War.

He is survived by his widow and one son.

TAYLOR — WILLIAM J. TAYLOR, M.D., died at the Malden Hospital, July 12, 1934. He was a recent graduate of Tufts College Medical School, and had served as intern at St. Luke's Hospital, New Bedford, Massachusetts. He was taken ill in New York while serving an internship at the Brooklyn Eye and Ear Hospital. He had taken his examinations before the Massachusetts Board of Registration in Medicine, and expected to return to Massachusetts to engage in practice. He is survived by his parents, a sister, and a brother.

HOLDEN — GEORGE WALTER HOLDEN, M.D., of Denver, Colorado, died in that city, July 12, 1934. He was born in 1866, formerly lived in North Brookfield, Mass., and graduated in medicine from the University of Vermont College of Medicine in 1895. At the time of his death he was the Medical Director of Agnes Memorial Sanatorium.

He joined the Massachusetts Medical Society in 1895, removed from Massachusetts in 1897 and resigned from the Massachusetts Medical Society in 1899.

NOTICE OF MEETING

WORCESTER NORTH DISTRICT MEDICAL SOCIETY

The Worcester North District Medical Society will hold its quarterly meeting at the Henry Heywood Memorial Hospital in Gardner, at 4 P.M., Wednesday, July 25. Dr. George Burgess Magrath of Boston will be the speaker. Dinner will be served by the hospital association at 6 P.M.

F. M. MCMURRAY, M.D., *Secretary.*

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

July 24-31—The IVth International Congress of Radiology will be held in Zurich under the presidency of Professor H. R. Schniz. General Secretary Dr. H. E. Walther, Gloriastrasse 14, Zurich.

August 18 - September 30—Medical Study Trip to Hungary. See page 975, issue of May 10.

September 3-6—American Public Health Association, at Pasadena, California. Dr. J. D. Dunshee, Chairman, Local Committee on Arrangements.

September 4, 5, 6—International Union Against Tuberculosis. For information address the National Tuberculosis Association, 450 Seventh Avenue, New York City.

September 10, 11, 12, and 13—American Congress on Physical Therapy will meet in Philadelphia at the Bellevue Stratford. For details write American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

September 10-15—First International Congress of Electro-Radio-Biology will be held in the Doges Palace at Venice. For details address the General Secretary of the Congress, Dr. Giocondo Protti, S. Gregorio 173, Venice (Italy).

September 27 and 28—International Association for Preventive Pediatrics will be held at Lyons. For details address the Secretary of the I. A. P. P., 15 rue Lévrier, Geneva (Switzerland).

September 28-29—New England Surgical Society will meet at Burlington, Vermont. For details address the Secretary, Dr. John M. Birnie, 14 Chestnut Street, Springfield, Mass.

October 22 - November 2—1934 Graduate Fortnight of the New York Academy of Medicine. See page 1240, issue of June 7.

October 31 - November 2—Massachusetts State Nurses' Association, Hotel Statler, Boston. For information write Miss Helene G. Lee, R.N., 420 Boylston Street, Boston.

April 29 - May 3, 1935—The American College of Physicians will meet in Philadelphia. For information address Mr. E. R. Loveland, Executive Secretary, 133-135 South 36th Street, Philadelphia, Pa.

June, 1935—Medical Library Association will meet in Rochester, N. Y. For details address the Secretary: Miss Frances N. A. Whitman, Librarian, Harvard University Schools of Medicine and Public Health, Boston, Mass.

DISTRICT MEDICAL SOCIETY

WORCESTER NORTH DISTRICT MEDICAL SOCIETY

July 25—See notice above.

BOOKS RECEIVED FOR REVIEW

Mental Deficiency Nursing (Simplified). By O. P. Napier Pearn. 281 pp. Baltimore: William Wood and Company. $2.00.

Essays on Chronic and Familial Syphilis. By Griffith Evans. 91 pp. Baltimore: William Wood and Company. $3.00.

Vital Cardiology. A new outlook on the prevention of heart failure. By Bruce Williamson. 294 pp. Baltimore: William Wood and Company. $5.00.

International Clinics. Volume II. Forty-Fourth Series, 1934. 318 pp. By leading members of the medical profession throughout the world. Edited by Louis Hamman and Collaborators. Philadelphia: J. B. Lippincott Company.

That Heart of Yours. By S. Calvin Smith. 212 pp. Philadelphia and London: J. B. Lippincott Company. $2.00.

Parasitism and Disease. By Theobald Smith. 196 pp. Princeton: Princeton University Press. $2.00.

Manual of the Diseases of the Eye. For students and practitioners. By Charles H. May. Fourteenth Edition, Revised. 496 pp. Baltimore: William Wood and Company. $4.00.

Clinical Miscellany. The Mary Imogene Bassett Hospital, Cooperstown, New York. Volume I, 1934. Contributors, Floyd J. Atwell, C. Lee Buxton, et al. 206 pp. Springfield: Charles C. Thomas. $3.00.

Diagnostic Clinique, Examens et Symptômes. Par A. Martinet et collaborateurs. 1138 pp. Sixième Édition Entierement Refondue. Paris: Masson et Cie. 145 fr.

Collens System of Diet Writing. Including: Diet calculator, obesity chart, and 100 menu prescription forms. By William S. Collens. New York: Form Publishing Company. $5.00.

BOOK REVIEWS

Practical Methods in Biochemistry. By Frederick C. Koch. 282 pp. Baltimore: William Wood & Company, 1934. $2.25.

A laboratory text for medical students. The book is to be commended for the large number of qualitative and quantitative procedures described together with references to the original papers. Explanations of the tests as well as the discussion of hydrogen ion concentration are given in a manner which should be readily understood by medical students.

For medical students, instruction in acidimetry and alkalimetry should have been given a prominent place preceding other quantitative work. Repetition of qualitative tests under different chapter headings is not infrequent. Some, such as those described for reducing sugar, phosphoric acid, and purine base in nucleic acid, might well be supplanted by references to modern and almost equally simple quantitative procedures. Several quantitative procedures are described with slight modifications of doubtful advan-

tage. Illustrations are the use of hydrogen peroxide in the digestion of organic matter for nitrogen or phosphorus determinations; the introduction of charcoal in and omission of acetone from the determination of sulphates in urine as previously described by Fiske. The Roe and Kahn method for blood calcium is open to serious objection.

Methods for determining other bases have been omitted.

Neurological Effects of Syphilis: Diagnosis and Treatment. By B. Buckley Sharp. 92 pp. Oxford Medical Publications. London: Oxford University Press, Humphrey Milford, 1933. 7s. 6d.

This brief monograph of less than one hundred pages covers the subject in an excellent manner from the clinical point of view. The diagnoses of most of the great variety of lesions caused by the invasion of the nervous system by syphilis are adequately presented and the appropriate treatment for each type of disease is given. The few illustrations are important; the literature seems to have been covered, although there is scant reference to all the work in this country. Apparently written for the English physician, this book, nevertheless, should serve a wider group and will be useful to many physicians in this country.

The International Medical Annual. A year book of treatment and practitioner's index. Edited by H. Letheby Tidy and A. Rendle Short. Fifty-Second Year, 1934. 579 pp. Baltimore: William Wood & Company. $6.00.

Prepared by Tidy and Short with a group of thirty collaborators, this publication is the meat of a ton of 1933 medical literature, largely British and American. The compact treatment of the material shows what can be done when one is forced to get away from the profuse use of mere words as necessary to the display of authority. Tidy has always given of the very best in this type of medical journalism. The subjects dealt with are of the most practical nature, and a high degree of discrimination is shown in the content of the volume. Every student who wants to make a rapid survey of the best work reported last year should welcome this offering. A most interesting article to Americans is that dealing impersonally with National Health Insurance. A valuable section is the introduction where attention is called to the most important contributions to each phase of medical science. Illustrations, reproduced from the original papers, are a unique and valuable feature.

A Short History of the Epidemic Infectious Diseases. By E. W. Goodall. 113 pp. London: John Bale, Sons and Danielsson, Ltd., 1934. 3s. 6d.

One of the best ways to study the history of medicine is to take a well-known disease and trace the origin of the concept of it back through the ages. In this brief book the author has done exactly this in relation to the common acute infectious diseases. The result is a work of worth, for it is not only written in an interesting style, but one feels that the book entailed a great deal of research done on a sound basis. References are given to the more important literature and sometimes there are actual quotations from the original work. There is an adequate index. Well printed, reasonably priced, this book makes a splendid addition to a series of books on the history of medicine which is being published in England.

Urinary Analysis and Diagnosis. By microscopical and chemical examination. By Louis Heitzmann. Sixth Revised Edition. 385 pp. Baltimore: William Wood & Company. $10.00.

This volume is a handy reference for one who does only an occasional urinalysis as well as for the technician who examines the urine for any of its many constituents. It is brought up to date and includes at the end a very valuable discussion by Dannreuther on the various tests of kidney function. The latter should be of particular interest to the clinician, and medical students will find in it a helpful guide to the practicability and relative merits of the many tests used for determining renal efficiency.

Traité de Physiologie Normale et Pathologique. Publié sous la direction de G. H. Roger et Leon Binet. Tome VII. Sang et Lymphe Réactions d'Immunité. Deuxieme Edition. Par MM. Achard, Justin-Besançon, et al. 730 pp. Paris: Masson et Cie. 100 fr.

Fifteen authorities contribute to this volume, which, like other volumes of this work that have been reviewed in this *Journal*, is of high standard. Among the first 345 pages is a chapter concerning the general properties and morphology of the blood by Jolly, which is not nearly so complete as his monographs on the subject; also very satisfactory chapters on the blood platelets by Pagniez and the coagulation of the blood by Zunz. In the second half of the book the "Système Lacunaire" is described in 98 pages by Achard. This term he applies to the peritoneal, pericardial and pleural cavities and he discusses the osmotic relationships of the fluids in these spaces. The lymph and lymph nodes by Binet and Justin-Besançon, respectively; immunity by Bordet and Schulmann and anaphylaxis by Besredka are topics that occupy the last 250 pages.

The references given are overwhelmingly French. For example, R. Fabre in discussing the physiology of hemoglobin states that Fontes and Thivolle in 1923 demonstrated that for one atom of iron there is always one molecule of oxygen fixed to the hemoglobin molecule. In this country we would refer probably to Hüfner, 1894, Hill, 1910 and Bancroft 1914.

The volume fulfills what Roger states the aims of this didactic treatise are: "To fix the state of a science at a moment of its evolution; to indicate to those who wish to understand the value of the acquired facts and results obtained; to disclose to those who wish to investigate the empty spaces of our knowledge."

The Essentials of Physical Diagnosis. By Robert W. Buck. 259 pp. Illustrated. Philadelphia and London: W. B. Saunders Company, 1934. $3.00.

As stated in the preface, the purpose of this book is to introduce the student to the principles of non-instrumental physical examination and the methods which he will later be called upon to use in daily practice. This purpose it fulfills admirably, presenting a clear and systematic description of the accepted procedure judiciously applied, together with concise but significant statements of the abnormal symptoms and signs to be encountered and their interpretation. A feature of the book is the degree to which it is based on original sources and its freedom from assertions to which exception may be taken. For use by students in connection with their practical courses in physical diagnosis it can be recommended in the highest terms.

ABSTRACTS OF PAPERS PRESENTED AT THE THIRTIETH ANNUAL MEETING OF THE NATIONAL TUBERCULOSIS ASSOCIATION AT CINCINNATI, OHIO, MAY 14 TO 17, 1934

Pathological Section

Relationships Between Hypersensitiveness and Immunity in Tuberculosis. D. E. Cummings and A. B. Delahant, Saranac Lake, N. Y.

The phenomena of anti-anaphylaxis which may be induced in animals sensitized to any antigen by injecting them with moderate quantities of that antigen at a time just preceding the development of hyper-susceptibility, suggested a procedure for maintaining a tuberculous guinea-pig in a non-allergic state. Experiments have demonstrated that this method is satisfactory and it has therefore been possible to study the response of previously infected or immune guinea-pigs to reinfection in the entire absence of demonstrable hyper-sensitiveness to tuberculin.

The guinea-pig is inoculated subcutaneously with 0.25 cc. of undiluted old tuberculin on the day before infection with either virulent or attenuated tubercle bacilli. Each day or each alternate day thereafter these tuberculin injections are continued, *choosing a new site for each inoculation.* If these simple precautions are followed, the animals will not lose weight during prolonged treatment, nor develop abscesses where the tuberculin is introduced. Animals treated in this manner, and infected or reinfected with virulent or attenuated tubercle bacilli fail to react to an intracutaneous injection of 0.1 cc. per cent solution of Old Tuberculin and they will appear quite normal in contradistinction to the cachectic appearance of animals that have become anergic just prior to death from generalized tuberculosis.

Guinea-pigs treated by the method described above were given a primary infection subcutaneously in the groin, with the attenuated Saranac Laboratory strain, R_1. After about 14 days these animals developed a small palpable nodule in the superficial inguinal lymph node, but they failed to react to an intracutaneous infection of 0.1 cc. of 2, 5 or even 10 per cent Old Tuberculin.

At the third and fourth weeks after this primary infection, separate groups of these treated animals were reinfected subcutaneously and intracutaneously with suitable doses of virulent tubercle bacilli. Treatment with tuberculin was continued for a period of about six weeks after reinfection, when the animals were sacrificed together with all of the necessary control groups.

Postmortem observations of these animals indicate that at least as high a degree of immunity to reinfection exists in those guinea-pigs that failed to show any evidence of hyper-sensitiveness to tuberculin as exists in those that are highly allergic.

Many other interesting observations have been made during the course of these experiments, a few of which follow:

1. Animals treated daily with only 0.1 cc. of O.T. as described above were frequently thrown into a state of protracted shock.
2. If the tuberculin treatment of an infected guinea-pig rendered non-allergic was discontinued, hyper-susceptibility to tuberculin soon appeared.
3. Passive anaphylaxis could not be produced with the serum of any of the tuberculin treated and infected guinea-pigs.
4. Significant concentrations of precipitins could not be demonstrated in the serum of the tuberculin treated and infected guinea-pigs.
5. The depression of the hyper-susceptibility to tuberculin in an infected guinea-pig was specific for tuberculin since the same treatment with concentrated plain broth or concentrated glycerin broth failed to prevent the allergic response.
6. Caseation could be demonstrated in the tuberculous lesions of tuberculin treated non-allergic guinea-pigs infected with virulent bacilli.
7. While no abscess developed if the tuberculin was injected each day into a new part of the sensitized body, when the material was repeatedly injected into the same area a large area of necrosis developed.
8. Material from such an abscess produced in an animal sensitized with dead tubercle bacilli when injected into normal guinea-pigs failed to confer an immunity to subsequent infection with virulent tubercle bacilli.
9. Direct inoculation of virulent tubercle bacilli into tuberculin abscesses, produced in sensitized guinea-pigs, resulted in as much dissemination of the infection as when the injections were made into sensitized but *untreated* control animals.

The Lesions Produced in the Lung by the Introduction of Aluminum Oxide and of Boron Silicate. Willis S. Lemon, M.D., Rochester, Minn.

Very fine particles of aluminum oxide and of boron silicate, of a size permitting phagocytosis, were introduced through a tracheal cannula into the lungs of two series of rabbits, and the animals were permitted to live for from one to twenty weeks.

The particles of each material produced an immediate inflammatory reaction, characterized by escape of serum, erythrocytes and polymorphonuclear cells into the pulmonary tissues. At the same time, phagocytosis of crystals occurred, and the alveolar phagocyte was the most active and important phagocytic cell. Its efficiency as a phagocyte was evidenced by the very large numbers of ingested particles. These were often so closely massed, and so numerous, that they obscured the cytoplasmic detail of the cell, distorting the contour or rupturing the boundary of the cell.

Even in the experiments of shortest duration, there was evidence of migration of phagocytic cells, and of exclusion of them from the lung by way of the lymphatic structures and bronchi. The latter method of exclusion was indicated by the exudates containing phagocytic cells laden with crystals, in all of the divisions of the airway, from the alveoli themselves to the larger bronchi, the cilia of which were effective instruments in the process of removal. The former method of exclusion was indicated by finding test material in the tracheobronchial lymph nodes, and by finding evidences of agglutination of phagocytes laden with crystals, in all parts of the lung where lymphatic tissue abounds.

Throughout all the experiments, the lesions which appeared as miliary or confluent, roughly spherical nodules, were found in the peribronchial, perivascular and subpleural lymphatic distributions. They were conglomerate and largest when situated at the hilum, and smallest and most discrete when related to smaller bronchi or vessels.

When aluminum oxide was used, neither the histiocytes nor the fibroblasts were stimulated to activity. The lesions were made up only of aggregations of phagocytic alveolar histiocytes which gave no evidence of multiplication nor of transformation into fibroblasts. When boron silicate was used, the lesions found in the oldest experiments showed some evidence of replacement by diffuse fibrosis having taken place in the stroma of the lung. The earlier lesions were almost identical to those resulting from aluminum oxide.

There was no instance of a lesion produced by either aluminum oxide or boron silicate, that even remotely resembled those produced by silica when particles of equal size, of uncombined silicon dioxide, were similarly introduced into the lungs of rabbits. There was no evidence that either material circulated in the blood stream, and accumulation of phagocytic cells bearing crystals was not found in remote organs.

These observations seem to support the solubility theory of Guy and his associates who believe that the characteristic connective tissue nodules of silica are produced because a tissue poison results from the contact of silica with the pulmonary tissues. Our experiments suggest that the biologic activity of uncombined silica is absent in the two substances employed and characteristic hyperplasia does not occur.

Amyloid Degeneration of the Adrenals as a Factor in Producing Symptoms of Addison's Disease in Chronic Pulmonary Tuberculosis. I. D. Bronfin, M.D., and Paul H. Guttman, M.D., Denver, Colo.

Since tuberculosis of the adrenals is responsible for about 90 per cent of cases of Addison's Disease, it is difficult to explain the unusually low incidence of this disease in tuberculosis sanatoriums. The dissimilarity of clinical manifestations in many ultimately fatal cases of pulmonary tuberculosis has led the authors to suspect adrenal insufficiency as a factor in those patients whose asthenia, loss of weight, anorexia and gastro-intestinal symptoms are out of proportion to the extent of activity of the pulmonary lesion.

Amyloidosis is not an infrequent complication of pulmonary tuberculosis. In a series of 100 tuberculosis patients who came to autopsy, eighteen cases showed amyloid disease. Of these, fourteen or 78 per cent disclosed also amyloid infiltration of the adrenals, involving mainly the cortex. The clinical analysis of these patients independent of the pathological study resulted in their classification into three groups. In the first group there were five patients upon whom a diagnosis of Addison's Disease was made during life. One of these patients was temporarily benefited by the administration of cortical extract and no improvement was noted from the administration of insulin. In the second group of five patients, the symptoms were strongly suggestive of Addison's Disease but a diagnosis was not warranted, and in the third group the terminal symptoms were attributed to the widespread tuberculosis. A histological study of the adrenals of the cases seems to show a relation between the extent of involvement of the adrenals and the symptomatology. In amyloid disease of the adrenals, the cortex only is involved and the medulla is spared.

Attention is called to the possibility that in many cases of far advanced pulmonary tuberculosis there are symptoms of Addison's Disease which are usually unrecognized and attributed to the existing tuberculosis. The recognition of these symptoms should prove helpful not alone by way of therapy when cortical extract becomes available commercially, but also to prevent the institution of surgical procedures which invariably precipitate a fatal termination. In the light of this study, amyloid of the adrenals should be given a more recognized position in the etiology of Addison's Disease.